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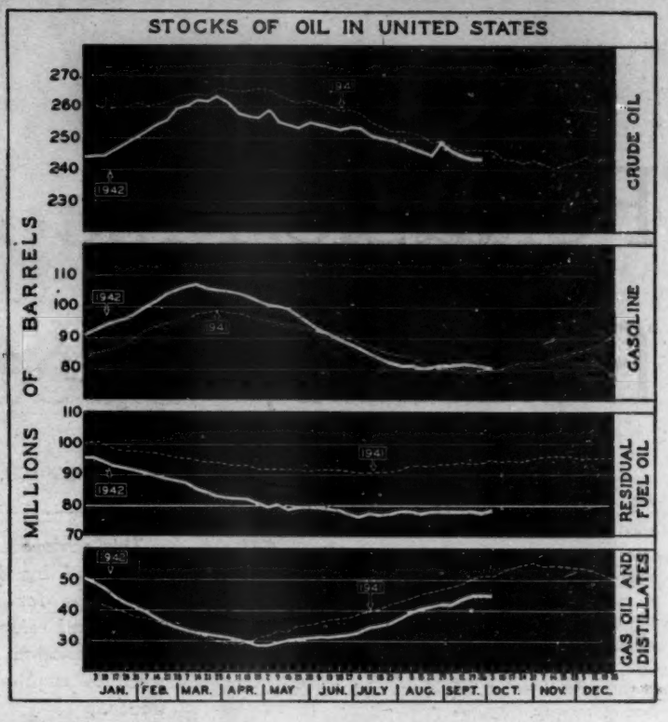
Trends

Stock Position Of California Reflects Operating Condition



WHILE the attention of the petroleum industry generally for several months has centered in developments east of and including the Rocky Mountain states, California and the West Coast area have had many problems not all of which have been solved. The inventory position in California reflects what has happened in its operations over the past year. Gasoline stocks for the week ending September 19 compared to the corresponding week of 1941 are 2,910,000 bbl., or 21 per cent greater. The gasoline-inventory position of the state is stronger than that of any other major refining area.

In the case of residual fuel oils, however, the opposite situation prevails with stocks 9,730,000 bbl., or 15 per cent less than they were a year ago. There has also been a 9 per cent decline in gas-oil and furnace-oil stocks. Crude-oil inventories have shown little change over the year with present production about 10 per cent ahead of last year. The loss of the East Indies oil to the Japanese early in the year and the rapidly expanding military activities in the Pacific, have greatly increased the demands for California fuel oils. The early rationing of gasoline in Oregon and Washington and the voluntary reductions in California have enabled refiners to keep pace with the demands for that product and some observers have foreseen a surplus unless means can be devised to reduce yields by increasing the percentage output of the heavier products.

As has been pointed out by representatives of the California industry from time to time the principal task ahead is to devise means to increase the output of the heavy oils —principally the residual oils, the wartime demands for which will continue to expand for an indefinite period. Operators in that state have not taken kindly to the suggestion that supplementary shipments of both crude oil and the low-gravity refined products be made from Texas. They take the position that a more economic program would be to enable operators to expand the production of low-gravity crudes in California areas where reserves have already been established with additional adjustments in refinery operations to balance output against needs.

Because of the strategic location of the West Coast from several war angles including large-scale production of airplanes, shipping, and other war goods, government officials have stated that California will be given special consideration in regard to adequate oil supplies for 1943 and later.

CRUDE PRODUCTION *3,686,445 bbl. daily average—down 230,480 bbl. One year ago 3,844,715 bbl.*

CRUDE STOCKS *242,785,000 bbl. as of Sept. 26 — down 1,509,000 bbl. One year ago 246,144,000 bbl.*

GASOLINE STOCKS *80,361,000 bbl. as of Oct. 3 — down 189,000 bbl. One year ago 79,923,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *79,036,000 bbl. as of Oct. 3—up 93,000 bbl. One year ago 94,978,000 bbl.*

GAS OIL AND DISTILLATES* *45,750,000 bbl. as of Oct. 3 — down 195,000 bbl. One year ago 51,420,000 bbl.*

REFINERY RUNS *3,879,000 bbl. daily week ended Oct. 3—up 77,000 bbl. One year ago 4,052,000 bbl.*

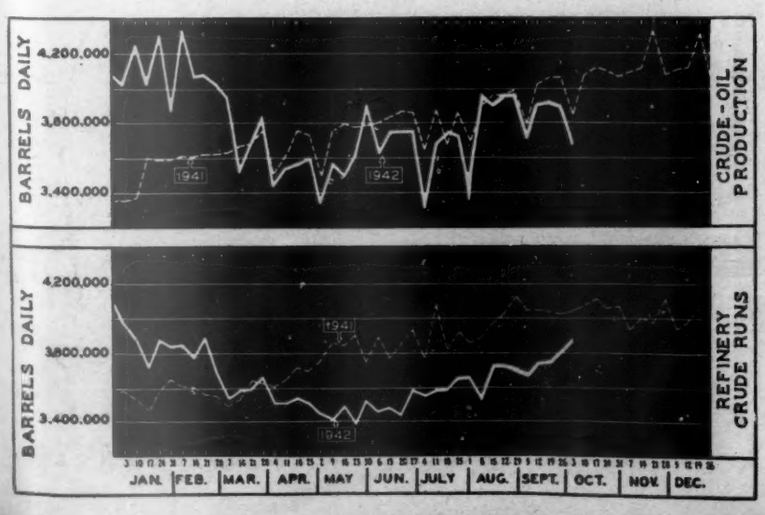
*Sept. 26 revised to 45,945,000 bbl.

DAILY AVERAGE PRODUCTION FOR WEEK

	Oct. 3 crude oil	Oct. OPC quota all oils	Sept. 26 crude oil
Arkansas	73,800	79,500	73,000
California	690,750	782,000	728,750
Colorado	6,825	7,000	6,775
Eastern fields	95,460	107,400	97,500
Illinois	264,170	280,000	260,920
Indiana	16,700	19,000	16,850
Kansas	282,700	294,000	296,900
Louisiana	325,700	337,200	330,050
North Louisiana	*98,700*	.....	*98,500*
Louisiana Gulf Coast	*227,000*	.....	*231,550*
Michigan	62,400	65,700	63,000
Mississippi	71,100	50,000	73,400
Montana	23,160	24,400	21,700
Nebraska	3,500	3,500	3,400
New Mexico	98,590	101,100	98,580
Oklahoma	365,550	417,000	368,550
Texas	1,207,200	1,407,600	1,380,350
East Texas	*293,000*	.....	*362,400*
West Texas	*183,000*	.....	*217,100*
North Central Texas	*139,000*	.....	*137,950*
East Central Texas	*81,700*	.....	*86,450*
Texas Panhandle	*85,000*	.....	*84,950*
Texas Gulf Coast	*367,000*	.....	*425,400*
Southwest Texas	*58,500*	.....	*66,100*
Wyoming	98,840	90,800	97,200
Total United States	3,686,445	4,066,200	3,916,925

Total production, January 1-October 3, 1942 ..... 1,046,294,020 bbl.
Same period last year ..... *1,033,518,435 bbl.
Texas shutdown days, Sept. 27, 30, and Oct. 3, preceding week Sept. 20, 26.

*Last week revised to 1,006,388,145 bbl.



Portable Pipe Line Developed By Army Speeds Fueling Job

By J. P. O'DONNELL

This review of a portable pipe line developed by the Army Quartermaster Corps for speeding military-fuel transit and refueling operations relates the adaptation of oil-industry equipment to requirements of the fighting forces.

Chief factor in the rapid construction times attained by Army engineers in laying the 15-ft. sections of 3-in. pipe is the hinged coupling requiring the tightening of only one bolt to effect a union between joints.

A PORTABLE pipe line which is capable of delivering gasoline at the rate of more than 6,500 bbl. per day and which can be laid at the rate of 2 miles an hour is one of the auxiliary weapons of the U. S. Army that may prove to be of considerable value in the varied theaters of war in which it is participating on an increasing scale. The pipe line is a development of the Quartermaster Corps which is charged with one of the Army's most important and difficult tasks, that of supply.

Every branch of the military forces uses oil products to some extent and their ability to function is dependent on their ability to obtain the essential gasoline, lubricants, diesel fuel, and other products. In order to reduce this vital problem to its simplest form, the Army has curtailed and standardized the number of fuels and lubricants and is employing every means of transport to deliver them. The portable pipe line represents one of the most ingenious expedients adopted to insure delivery.

This pipe line is made up of 15-ft. sections of 3-in. steel pipe. These sections are joined together by simple, readily installed couplings. The couplings are hinged and the open ends are drawn together by a bolt fitted through lugs. The bolt is tightened with a small, specially adapted wrench. The couplings permit a 3° curve so that it is not necessary to lay the pipe perfectly straight. The line can be laid with remarkable rapidity. In training sessions a full mile of pipe has been laid over rolling terrain in 30 minutes.

The maximum length reported used in training has been 5 miles but, since each unit is self-contained, an indefinite length can be laid. While the terrain is an important factor in the efficiency of the line, no insurmountable barriers to its operation have been encountered. Rivers, lakes, railroads, and highways have been crossed and steep grades have been climbed. Still-water crossings are made with an oil-resistant, synthetic-rubber hose. This hose is attached to another filled with air by means of a line laced through rings on the former. The rings are spaced at sufficiently frequent intervals to prevent the oil-carrying line from bending. The air or "pontoon" hose supports the other while it is towed across the water and attached to the steel line on the opposite shore. Highway or railroad crossings are made by using existing culverts when they are convenient or by digging trenches. Since the pipe is only 3 in. in diameter and is designed to be laid aboveground, shallow trenches are sufficient. In crossing railroads the pipe may be laid in a shallow trench dug between the ties.

The line was developed primarily for the delivery of gasoline but any of the so-called "white products," including diesel oil, can be handled with almost equal facility. The products may be taken from tank trucks, tank cars, or tankers after connections have been made with

Right: Joining 15-ft. sections with easily installed couplings. The line has been laid at the rate of 2 miles an hour. Below: A synthetic-rubber hose, supported by an air-filled, pontoon hose, is used for crossing still water

Below: Gasoline-powered centrifugal pumping unit used on portable pipe line. This unit is capable of delivering gasoline at the rate of 200 g.p.m. over rolling terrain

adjustable couplings. Thus the line may be used for supplying temporary air fields which may be located several miles from the nearest railroad siding, for unloading barges along a swampy river shore that cannot be approached by motor vehicle or for unloading tankers at isolated islands or beaches not equipped with adequate docks. Tankers or barges, anchored as far as a mile offshore, may be unloaded by this means.

Pumping power is furnished by 20-hp. gasoline engines driving centrifugal-type pumps through a multiple V-belt. The pump and engine are attached to the same base and are handled as a unit. Easily installed flanged bends are used to connect the line and the discharge end of the pump. The flexible hose, when it is used, may be attached to the pump by a screw connection.

Various type take offs are included in the fully equipped units. It is possible to install valve-equipped, "T" connections at intervals along the line. Adapters to which as many as five discharge lines can be attached may be used at any of the "T" connections. Thus a large number of vehicles or planes can be fueled simultaneously depending on the size of the servicing area, the amount of equipment, and the personnel available. Since the capacity of the line is 200 g.p.m. the time in minutes required for filling would be equal to 200 divided by the capacity of the tanks times their number. In one instance a score of planes were fueled on an average of 1 minute and 20 seconds per plane.

In transporting the pipe line, five small trucks are required for each mile of pipe and equipment. Separate sections consist of ½ mile of pipe with the necessary pumping equipment, connections, etc., so that each section, in reality, is a self-contained unit. Ten men are normally assigned to each section and, with a crew of this size, as much as a mile of line has been laid in 30 minutes over rolling terrain. Incidental equipment which is also carried includes leak detectors and fire-fighting material.

The potential value of this unusual piece of military equipment may be appreciated from the fact that if five of them were used simultaneously, they would be able to fill the fuel tanks of an entire armored division in less than 1 hour and 45 minutes. Such rapid servicing could and may easily mean the difference between a decisive victory and an overwhelming defeat in some important battle in the islands of the Pacific, in the arid wastes of the Near East, or in the opening of a second front in western Europe.

●

OPC Sets Up Machinery to Handle Plan of Pooling Products

WASHINGTON, D. C.—OPC moved rapidly this week to set up administrative machinery to carry into effect product-pooling plans required by Directive 59. Standard minimum specifications have been drafted and will be issued soon. It is understood these will call for only two grades of gasoline, regular and premium, with octane ratings about the same as present averages and that specifications for other products will make little change in products now marketed by most companies in District 1.

The program will be in charge of L. T. Kittinger, vice president of Shell Oil Co., Inc., and recently with the WPB salvage program, who will establish offices in New York with a large staff and probably will have title of general manager of the supply program. Staff activities will be financed by the industry under arrangements similar to industry committees. Headquarters for each of the six zones will be established in Boston, New York, Pittsburgh, Philadelphia, Richmond and Atlanta.

Losses at sea continue as a factor in total requirements for petroleum. Here seamen aboard a torpedoed tanker discharge cargo into the Atlantic to keep the vessel afloat, hoping to bring it to port for repair

This Week...

PRODUCTION.—Rate can't be reduced below present 4 million per day, Coordinator Ickes reported to A.I.M.E. Needed, he says, to secure adequate amounts of 100-octane gasoline, toluene, butadiene, etc. . . . "Seed" money, procurable from higher crude prices, required to prevent shortage of oil crop, O'Mahoney subcommittee warned. Other testimony stresses need for exploration, caution of possible oil shortage. . . . Natural gas required for carbon-black manufacture may be reduced. "Soft" or "furnace black" recoverable at rate of 6 to 8 lb. per 1,000 cu. ft., contrasted to 1.4 lb. for channel black. Sharp reduction in Louisiana gas-oil ratio imminent. . . . Acceptance of lease-quotas as proration basis gradually forced on states; by OPC which refuses pumping equipment for densely spaced wells, particularly in East Texas. . . . Ultimate intention is to force pulling unnecessary wells, use salvaged equipment in new producers. . . .

MARKETS.—Both dry and wet natural gas placed under Petroleum Price Order 88. OPA says will benefit producers by establishing May 1, 1941, as basing point. . . . Suppliers to distribute fuel-oil ration applications to customers, certify amounts consumed last year. Customers now accepting deliveries, issuing supplier promisory notes to turn over covering coupons when they are issued by OPA. . . . Products steady in most refining centers, automotive gasoline on Pacific Coast the outstanding exception. . . . Crude buyers keep tight check on connections, particularly in midwest. . . .

RUBBER.—OPA liberalizes attitude on recaps. Motorists given more assurance of replacement rubber for essential driving. Meanwhile, Rubber Director Jeffers renews plea for conservative car operation. Realization appears growing in high places that complete exhaustion of civilian tires unthinkable, would stagnate war production, stifle transportation system. . . . Process examined for producing synthetic rubber from daily byproducts. But, it's still decidedly in test-tube stage. . . . Recaps available for essential drivers doubled this month, car owners urged to apply for replacements before tires reach irreparable state. . . .

REGULATIONS.—Interstate Compact support added to industry's plea for single-agency coordination of petroleum affairs. . . . Criticism of Leon Henderson's refusal to adjust prices for higher yields of fuel oil becoming more vitriolic. Refiners contend war-imposed burdens are inexcusable and remediable, want relief, can't understand rejection of indisputable arguments. . . . Antitrust prosecution of 21 chemical companies and 65 officials deferred until after war, at request of Messrs. Patterson and Forrestal. Attorney General Biddle consented to delay on plea that war program would be hampered. . . .

TRANSPORTATION.—Bigwigs conferring in Washington on extension of big-inch line to East Coast, decision probable within few days. . . . ODT orders all carriers to return tank cars to points of origin without waiting for instructions from shippers. . . . Rail movement to East Coast declines slightly, averaging 835,530 bbl. daily in last reported week. . . . Pooling of eastern terminal facilities to swing rail receipts into higher ground by mid-October.

PRIORITIES.—Equipment exporters given new preference order, P-98-d, as companion for Forms PD-311. . . .

Armed Forces Absorb Most Oil Withdrawn From Civilian Use

By H. STANLEY NORMAN

Conclusions of some within and without the industry that gasoline and fuel-oil rationing will be reflected in contraction of over-all demand for domestic petroleum are discounted by an analysis of the near-future outlook. This summary of prospective petroleum requirements, based primarily on a less violent impact on demand than generally anticipated by East Coast motor-fuel rationing, indicates that military, war-industry, and lend-lease consumption will offset future contractions in civilian products.

TRANSFER of a portion of the normal-civilian consumption of petroleum to military, war-industry and lend-lease requirements, a transition which is a larger volumewise factor than most realize, indicates that the demand for domestic crude oil will at least hold at present levels, or possibly increase, during the next 6 to 9 months.

Details on total consumption, exports, imports and domestic demand are no longer available in the concise form of peacetime years. But there are sufficient data at hand to indicate rather conclusively that imposition of nation-wide rationing of motor fuel and regional rationing of burning oils will cause no major disturbance of the general demand for domestic crude.

There have been sharp and significant changes in the focus of demand. There will be other changes in the future as the industry swings farther toward a fuel-oil economy. Substantially larger percentages of the total demand will be for the various grades of fuel oil with corresponding recessions in requirements for domestic automotive gasoline.

Voluntary Curb Effective

Evidence is growing, however, that voluntary curtailment of civilian driving has already discounted most of the reductions that might have otherwise resulted from nation-wide gasoline rationing. There is indication that the darkest episode in the rubber shortage has passed and that the outlook for automobile-tire replacements is swinging to a brighter side.

Arrangements developed within the past 2 weeks to insure recaps and new tires made of reclaimed rubber for essential automobile operation appears to have broad significance. If the Office of Price Administration has found that it cannot strangle automobile operation with one hand without choking war production simultaneously with the other, the oil industry will then have confirmation of a contention it has made repeatedly since Pearl Harbor.

This indication of a major change in Washington psychology is of concomitant benefit to the petroleum industry. Complexity of petroleum and of the industry's facilities for converting crude into useful products precludes complete reservation of its services for the military forces and war industries. In order to maintain its efficient production of synthetic-rubber components, aviation gasoline and Navy fuel oil, the industry necessarily must manufacture substantially larger volumes of civilian products. This fundamental balance is axiomatic.

The most conclusive evidence that rationing is a milder depressant on total crude-oil requirements than many anticipated is given by comparison of the charted record of forecasted demand, actual production and their influence on inventories during the early and midsummer months. Forecasts of crude-oil requirements during April, May, June and July were much lower than justified by ultimate consumption. There is general agreement now that inordinate stress was placed on the effect of East Coast gasoline rationing. Although restrictions on nonessential driving were inept and loosely enforced during the temporary rationing period from May 15 to June 22, data on more recent months indicate that too little value has been assigned to military requirements and lend-lease obligations.

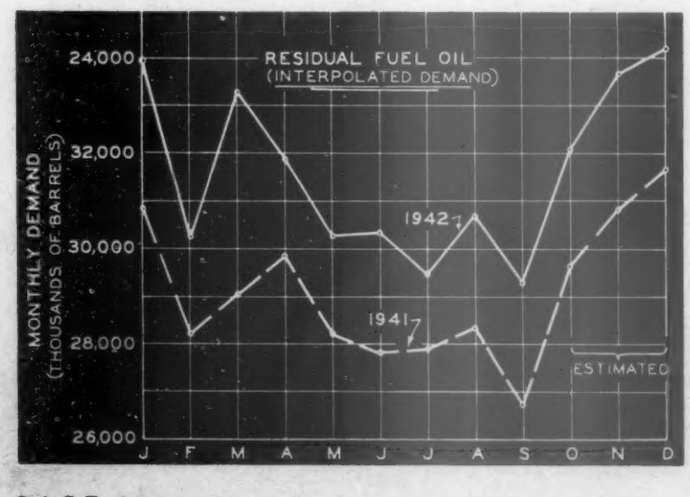
Evidence that the permanent coupon-rationing system in the eastern states caused a reduction of approximately 11 per cent in the motor-fuel demand is reasonably well confirmed by Bureau of Mines records for June and July. Consumers in the rationed area normally consume about 36 per cent of the gasoline used in this country and the reduction there, because of the absence of restrictions in other states, was several per cent greater than the national figures disclose. Consumption in the rationed states is down approximately 20 per cent, according to most estimates. Spot traffic checks on rural highways indicate that automobile driving has been reduced in the order of 49 per cent in rationed states while car operation has been reduced 27 per cent in the unrationed area.

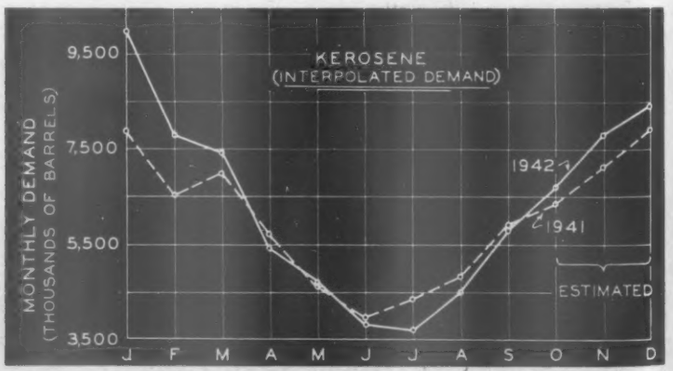
Failure of gasoline-consumption statistics to confirm the extent of reductions in automobile operation indicated by the rural-highway traffic counts is further evidence that military requirements, lend-lease shipments and war-industry demand are more potent factors in the volume of petroleum needed than most people realized.

Tax Receipts Reflect Drop

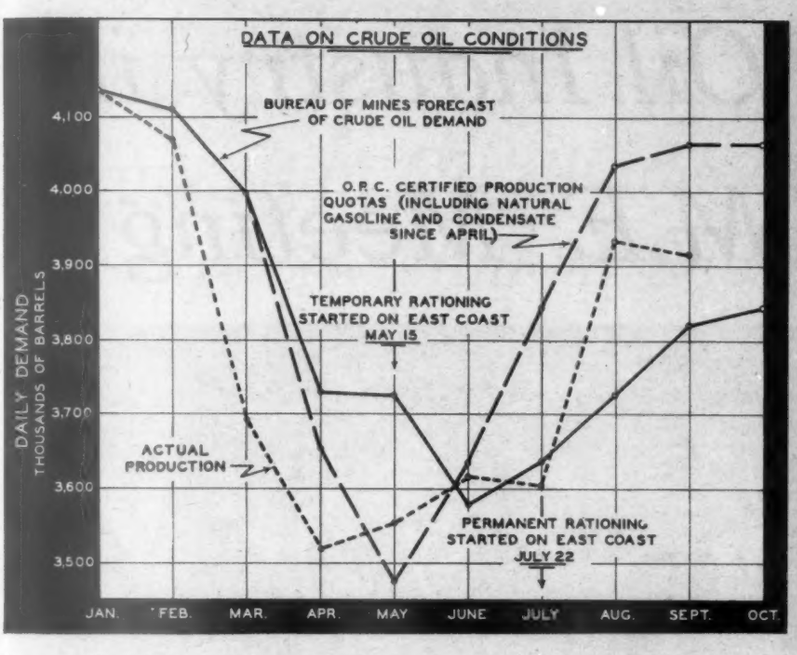
In 10 rationed and 21 unrationed states, federal gasoline-tax collections in August, mainly representing July consumption, were down 25 and 17 per cent, respectively, compared to a year ago. These figures indicate that voluntary rationing lacked only 8 per cent of equaling the coupon-enforced curtailment in the eastern states. The relation of curtailed gasoline consumption resulting from coupon rationing and voluntary conservation of tires in the unrationed area is significant, particularly when considered in conjunction with the policy developing in Washington to make recaps available for essential automobile operation. Results of spot checks on traffic and evidence given by tax returns show that nearly 70 per cent of the impact of national rationing already has been absorbed in voluntary curtailment outside the eastern states.

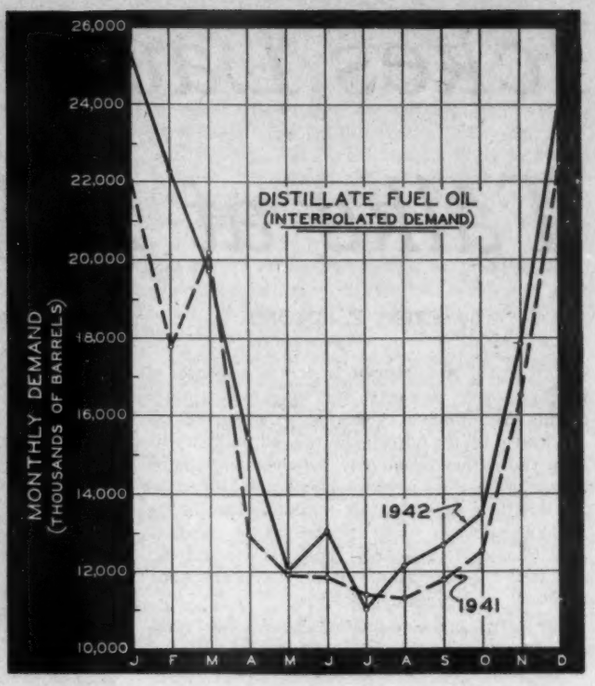
Another equally important factor in appraising the future outlook for crude demand is the increase in fuel-oil requirements. Influence of fuel-oil rationing on consumption in 30 eastern and





Requirements for residual fuel oil charted here are expected to be a major factor in maintaining the over-all petroleum requirements in this country at current levels. Colder weather is expected to overcome midsummer trends in kerosene demand which have been submerged by blending with heavier fuels


DATA ON CRUDE OIL CONDITIONS
BUREAU OF MINES FORECAST OF CRUDE OIL DEMAND
O.P.C. CERTIFIED PRODUCTION QUOTAS (INCLUDING NATURAL GASOLINE AND CONDENSATE SINCE APRIL)
TEMPORARY RATIONING STARTED ON EAST COAST MAY 15
ACTUAL PRODUCTION
PERMANENT RATIONING STARTED ON EAST COAST JULY 22
DAILY DEMAND THOUSANDS OF BARRELS
4,100
4,000
3,900
3,800
3,700
3,600
3,500
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT.



Curves on forecasted crude-oil needs and actual production indicate that too much weight was assigned impact of gasoline rationing. Distillate fuel-oil demand is estimated for last quarter

midwestern states during remainder of this year and the first 3 months of 1943 is difficult to appraise. But there is general agreement that actual curtailment will fall considerably short of the 33 per cent goal set by the Office of Price Administration. Enforced curtailment of automobile operation is, in many instances, to deprive civilians of convenience and luxury while cold homes and offices are an imposition of actual discomfort and creation of a health hazard. The consensus is that domestic consumption of fuel oil in rationed states will be reduced not more than 20 per cent of what it would have been without restrictions.

Military Requirements High

Behind the outlook for domestic fuel-oil consumption and, in many ways, overshadowing other aspects, are the unappraisable requirements for military operations. Spread of active combat zones to more distant frontiers, is connoted by invasion of the Solomon Islands and more recently by the advance in the Aleutians.

Demand for distillate fuel oil through July this year was 0.8 per cent greater than for the first 7 months of 1941 while requirements for residuals were up 8.9 per cent for the same period. Demand, interpolated here and in the accompanying charts from production and changes in stocks, does not take into account imported oils which have been virtually extinct in recent months. Consequently, the method of calculation distorts actual demand by the volume of imports, but it reflects a representative trend and is comparatively accurate in showing the chief requirements from domestic crudes.

The accompanying charts project the interpolated-demand curves for various grades of fuel oil through the fourth quarter of this year. Estimates may be slightly on the optimistic side, although the shipbuilding schedules, commencement of operations by new war plants and increased demand by military forces of the United Nations are virtually certain to offset the contraction of nonessential civilian consumption.

The higher demand for distillate fuel oil, averaging 9.8 per cent for the first 7 months, has been much more variable than the comparatively constant increase, averaging 8.9 per cent for residuals. The maximum increase for distillate-fuel consumption occurred in February when interpolated demand this year was 25.2 per cent greater than a year ago. Deficits were registered this year in March and July with demand being 3.8 per cent below last year in the final reported month. The relatively poor showing in July is probably owing to a diversion of transportation facilities to movement of gasoline for the late summer months and to the growing practice of upgrading residuals by refinery adjustments or blending.

The range of increases by months in interpolated demand for residual fuel oil is between 6.1 per cent in July and 15 per cent in March. Steadiness of the increases this year and the character of consumption which is less amenable to conversion give virtual assurance that the trend will continue at previous rates of gain and will probably increase in direct proportion to military and war-industry operations.

Interpolated demand for the major petroleum products, computed from statistics on production and stock changes, for the first 7 months of this year and 1941, follows:

(Figures in barrels daily)

Product—	1942	1941
Gasoline	1,753,200	1,808,000
Residual fuel	1,036,000	951,000
Distillate fuel	559,000	500,000
Kerosene	203,200	189,600
Total	3,551,400	3,457,600

The table shows that a decrease of 54,800 bbl. in the daily interpolated demand for gasoline has been more than offset by an increase of 148,600 bbl. in the daily requirements for three grades of fuel oil. This indicated offset of lower gasoline requirements by increased fuel-oil consumption, most observers believe, will be approximately maintained for the next several months. A probable tendency of fuel rationing in the large centers of domestic-burner operation to modify requirements for distillate oils will be partially or wholly offset by greater demand for residuals.

Programs for Tire Rationing and Gasoline Curb Being Merged

WASHINGTON, D. C. — Gasoline and tire-rationing systems are being merged by the Office of Price Administration in order to carry out the double objectives of the Baruch report to conserve existing tires and provide rubber for all vehicles now in operation.

Steps are being taken to provide some sort of tires for all motorists within the limits of the mileage allowed by the gasoline-rationing system. For example, holders of "A" gasoline cards, which will be the average motorist throughout the country after about November 22, will have assurance of obtaining sufficient rubber to drive 2,880 miles per year if his present tires will not last that long. Holders of other types of ration cards will get tires for their increased driving.

This does not mean new tires of natural crude or high-quality synthetic, but more probably recaps made of reclaimed rubber or one of the synthetics unsuited to heavy-duty tires such as butyl or thiokol, or possibly complete tires made of the less-rugged materials. Such tires will not be satisfactory for high speeds or long service, but the plan is expected to keep America's 27,000,000 passenger cars in essential service until better tires become available from the synthetic-rubber program a year or so hence. If, as expected, tire and recap materials become more plentiful next spring, the gasoline-mileage ration restrictions probably will be somewhat liberalized.

As the first step in this program, OPA froze the sale of used tires pending their inclusion in the tire-rationing system. The object is to maintain a stock of usable tires which can be recapped, as tires too badly worn do not recap satisfactorily. OPA also doubled the amount of recap material available under the rationing system and urges all motorists whose tires are wearing thin to apply to their local ration boards for recapping certificates.

Ickes Lauds Oil Industry in Talks at A.I.M.E. Meeting

By HARRY F. SIMONS

ST. LOUIS, Mo.—Harold L. Ickes, secretary of the interior and petroleum coordinator, noted for his sharp tongue, showed also that he was appreciative of the efforts of the oil industry to keep the nation adequately supplied with petroleum during the present turmoil brought on by the war, in a speech before a joint session of the A.I.M.E. and the fuels division of the A.S.M.E. here October 1. The only criticism was indirect and concerned the failure of Illinois to enact satisfactory conservation legislation.

The petroleum coordinator also forecast grimmer days to come when he said toward the close of his talk: "the oil industry, together with the members of the staff of the OPC, are taking perhaps the most revolutionary step of all in the determination to strip for war. A unitization program is under way which is going, in a very large measure, to mean the submergence of individual identities for the duration of hostilities. Terminal facilities are to be shared by competing companies. The determination of what oil of what kind, shall go to whom—and when—is to be subject to central authority. It is a cooperative movement by which the many different companies and individuals in the oil business will operate, in many ways, as a single industry, working at the common task of winning the war—and it is all being carried out on a voluntary basis."

John R. Suman, left, vice president, Humble Oil & Refining Co., introduced Harold L. Ickes, Petroleum Coordinator, for his talk before the A.I.M.E. at St. Louis. Right: Eugene McAuliffe, president of A.I.M.E., was chairman at the banquet session

Concentrated Talk on Oil

Mr. Ickes concentrated on oil exclusively, although he pointed out that similar remarks could be made on the necessity of conserving other natural resources.

Lashing out in two directions at once, Mr. Ickes said: "We are confronted by the dangerous notion, selfishly fostered over many years, and still held by a few of the uninformed or by the half-baked optimists, that there are unlimited supplies of oil buried in the soil of our great producing states and that the immediate acquisition of ample quantities is merely a matter of turning a valve or the sinking of a few more wells."

As far as the domestic supply is concerned, Mr. Ickes pointed out that he had himself stated repeatedly that there was no present shortage of oil but that there was a shortage of transportation facilities to move the oil where it was needed.

"However," he continued, "the time has come when we can no longer think in terms of our domestic requirements alone. We must supply a large part of the huge and ever-growing needs of our Army, Navy, and Marine Corps, fighting on multiple fronts of this global conflict. We must supply our fighting allies with the oil to take the place of that lost in Borneo, Java, Sumatra, the Caucasus. And we must make our plans so that we shall be ready to fill the gap if, by some tragic turn of the war, the enemy should seize other rich fields. We would all prefer not to think of such eventualities, but we can't fight a war on a basis of ostrich-like optimism. We must face every possibility realistically, and be prepared to meet it if it materializes.

"Suppose the Axis should break through," Mr. Ickes pointed uot, "and conquer the fabulous fields of Iran and Iraq, and deprive our side of the production of the refineries at Abadan, Suez, and Haifa. Conceive, if you can, the enormity of the burden which would then be ours—for, from the United States, would have to come almost all of the oil for the fighters for freedom."

Over-All Position Only Fair

From the long-term view, our over-all crude-oil position is only fair, according to Mr. Ickes, and in certain grades and in strategically located fields, the situation is no where as good as it should be. The coordinator then decried the Illinois situation, pointing out that since 1937 over 150 fields (4 of them major ones and several others of great importance) had been discovered but because of unsound development and methods of production, over half of the reserves have been produced in only 5 years. As a result, the total yield from these pools will be substantially below what it should have been, and an oil supply which should have been a source of national strength is on the road to exhaustion. Wasted natural gas during the years of 1939 to 1941 was more than the total consumption of the state during that period, he said. The value to the consumer was about $120,000,000, according to Mr. Ickes.

"Now that the people of the Middle West are to experience the comparatively mild discomfort of fuel-oil rationing," he went on, "they might profitably cogitate the sort of practices which have wasted the oil that they now cannot get. In their own interest, they might let their legislators and their state officials know that—late though the hour may be—the oil of this basin is not to be squandered from this time forward.

"What is incredible is that the owners of the land should have permitted anyone to throw away so much of that wealth. . . . Of course the facts were shamelessly misrepresented to

A group of those interested in the Illinois symposium presented at the A.I.M.E. meeting. M. M. Leighton, chief of Illinois Geological Survey; William B. Heroy, petroleum coordinator's office, who delivered the opening paper; Curtis L. Wilson, dean, Missouri School of Mines; and E. G. Robinson, Shell Oil Co., Centralia, chairman of the St. Louis section of A.I.M.E., who presided at the Friday morning session

them . . . but the owners of the land should have known that a stranger seeking to make a bargain with them for profits for himself would overreach them if he could. That has been the law of exploitation from the beginning. The promoter can always be depended upon to take care of himself and, in this case, the exploiters prevented the enactment of a sound conservation law in Illinois."

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Symposium On Illinois Oil Features Technical Sessions

ST. LOUIS, Mo.—A review of the geology, development, and economic position of the Illinois basin fields was presented in four papers before the regional meeting of the American Institute of Mining and Metallurgical Engineers here October 1 and 2. In addition, those in attendance heard more general papers on the geology and mineral resources of the Ozark and the Central Mississippi Valley regions.

William B. Heroy, director of reserves, Office of Petroleum Coordinator, Thursday afternoon led the symposium on the Eastern Interior basin with his paper, "Oil Production in the Eastern Interior Basin." This was followed by the Friday morning session at which A. H. Bell, Illinois Geological Survey, presented "History of the Oil Industry of the Eastern Interior Basin With Special Reference to the Role of Geology and Engineering." Ben F. Hake, Gulf Refining Co., Indianapolis, Ind., talked on "The Occurrence of Oil in the Eastern Interior Basin," and Walter H. Voskuil, mineral economist, Illinois Geological Survey, discussed "The Strategic Location of the Oil Production in the Eastern Interior Basin." Chairman for the symposium on Illinois was E. G. Robinson, Shell Oil Co., Inc., Centralia, Ill.

Heroy Reviews Geology

Mr. Heroy pointed out in his paper that during the past 5 years the number of producing wells in the Eastern Interior basin had increased from 18,675 to 29,449 at the end of 1941. Production increased from 7,500,000 bbl. in 1936 to 140,000,000 last year. The basin has an area of nearly 50,000 sq. miles and 75 per cent of it is in Illinois, 15 per cent in Indiana and 10 per cent in Kentucky. Deepest well in the area is 7,207 ft., and it is located at Cisne and is bottomed in the Prairie due Chien of Cambrian age.

The general geologic conditions existing in the basin were reviewed by Mr. Heroy who went on to point out that the system of land tenure and the system of ownership of mineral rights also played an important part in the minerals development of the state. The states also inherited the common law of oil and gas ownership with its rule of capture.

"The history of oil and gas development in Illinois," Mr. Heroy said, "can be divided into three periods: (1) Random drilling; (2) testing of geologic structures, and (3) geophysical exploration. From 1866 to 1905, a few small oil fields were developed in the state. From a production of 180,000 bbl. in 1905 the state's output jumped to 5,000,000 in 1906 and 33,000,000 in 1908. To the end of 1912, approximately 19,000 wells were completed in the southeastern district, the source of this oil. These fields have an area of 92,000 acres, have produced 430,000,000 bbl. of oil for an average of 4,700 bbl. per acre and 22,500 bbl. per well.

The second period begins in 1912 and extends to 1936. During this period, less than 10 oil fields were found in Illinois and none was of major importance. A number of structures were mapped but operators did not seem to be interested in testing. The total production of fields found in Illinois to the end of 1936, exclusive of the southeastern areas, was approximately 15,000,000 bbl. from about 1,500 wells.

The third period begins late in 1935 when the first reflection seismograph work began in the area and during the next year from six to eight crews were engaged. From 10 to 15 seismograph parties were working in Illinois in 1937 and the peak was reached in 1938 when 20 crews were busy in the area.

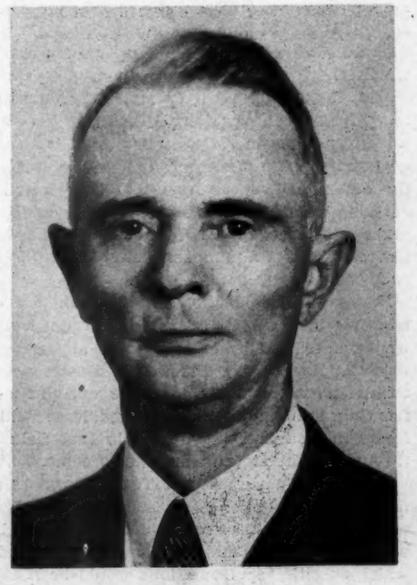
In 1936, 33 wildcats were drilled in Illinois and in Indiana there were 56 wildcats, four of them successful. After the discoveries at Patoka, Cisne, and Clay City, Ill., exploratory drilling expanded with 128 wildcats in 1937, 22 of them oil wells. The completion of 782 wildcats and outposts in 1941 resulted in 103 oil wells. Of the 392 tests which were strictly wildcats, 40 were oil wells and 128 of these were drilled on geophysical or geological information and the other 164 were based on promotion or acreage. None of the latter was productive.

Introduction of rotary led to rapid development, production was unrestricted and as a result, peak production was reached in a short time. A study of 40 Illinois fields shows that the peak-produc-

(Continued on Page 39)

Arch L. Foster, Authority On Petro-Chemistry, Joins Journal

Arch L. Foster, one of the petroleum industry's most widely known chemists and writers on technical subjects, has joined the refinery editorial staff of The Oil and Gas Journal, effective October 1. Mr. Foster's appointment is a further recognition by the Journal's management of the rapidly increasing importance of chemical developments in refinery processing, greatly emphasized in recent months by the war's demands for new products from petroleum.



ARCH L. FOSTER

For the past 2 years, Mr. Foster has been technical assistant in the research and patent departments of Phillips Petroleum Co., in which capacity he has been in direct touch with recent changes in petroleum technology. For several weeks this year he served in an advisory capacity with the refining division of the Office of Petroleum Coordinator for War with headquarters in Washington, D. C.

Mr. Foster, or "Arch" as he is known by the refining industry throughout the United States, is a native Texan, having been born on a ranch in Tarrant County. He was educated in that state, attending Southwest Texas State College for 2 years, followed by 3 years at University of Texas, where he completed the work for bachelor's and master's degrees. He specialized in chemistry and chemical engineering under the late Prof. J. R. Bailey, distinguished American organic chemist and chemical educator. Following his graduation in 1921, he carried on graduate work for a year. He did research work in pharmaceutical intermediates and received his first training in catalysis at that time.

His university work was interrupted by 2 years' service in the U. S. Army during the 1917-18 World War. He was a second lieutenant and musketry instructor at the war's ending.

After completing his university training, Mr. Foster joined the laboratory staff of Gulf Refining Co., at Port Arthur, Tex., studying the aluminum chloride cracking process under A. M. McAfee, the inventor. In 1925, he became affiliated with the Bureau of Mines at San Francisco, Calif., being in charge of chemical research work on crankcase lubricating oils.

He was transferred to Washington as assistant in refining technology for the petroleum division of the Bureau of Mines. He represented the bureau on committees whose membership included technologists from the petroleum industry dealing with specifications and other problems, and assisted the chief engineer in supervising refining technological investigations.

He resigned this position in 1929 to join the editorial staff of the National Petroleum News as technical editor. He continued in this work for 10 years and was then connected with Lubrizol Corp. during 1939 and 1940 in its technical service department.

Mr. Foster is a member of the American Chemical Society and the Society of Automotive Engineers.

STATE CAPITALS...

CALIFORNIA

DATA ON RETURNED QUESTIONNAIRES, in the survey of pumping equipment being carried on by the Conservation Committee of California Oil Producers, are being assimilated preparatory to submitting data to Washington in substantiation of a proposed amendment to Conservation Order M-68.

The proposed amendment is designed to relax restrictions on use of artificial-lifting equipment so that maximum production of heavy oil can be attained. At present, terms of M-68 are such that transfer of equipment from idle to producible but unequipped wells is practically prohibited, owing to acreage restrictions and other limitations, and it is hoped that the order may be amended to permit maximum utilization of all such equipment.

Operators who had not returned their questionnaires were urged by R. P. Huggins, chairman of the conservation committee, to do so at their earliest opportunity, so that full data could be submitted to Washington. Mr. Huggins also remarked that many operators had stated that they would be unable to rehabilitate old wells under present economic conditions, but that they had failed to state the amount of oil they could produce if such conditions improved, and requested that an estimate of possible production be included hereafter.

L. L. Aubert, vice chairman of the OPC District 5 production committee outlined the factors in the allocation schedule for October, which has been submitted to Washington for approval. The schedule allocates 733,500 bbl. per day, with 4,500 bbl. daily reserved for new wells, making a total of 738,000 bbl. daily.

He explained the apparent drop of 12,000 bbl. from the preliminary September figure of 750,000 bbl. daily as being mandatory under the refusal of the OPC to approve schedules in which certain fields were allocated their capacities where such capacities were above maximum efficient rates. Under this policy, the committee was confined to the 738,000-bbl. figure, and must rely upon stored oil to fill deficiencies, he said.

TEXAS

AUTHORIZATION HAS BEEN SOUGHT by Sun Oil Co. to transfer allowables on an East Texas lease from wells which have ceased flowing to those that are still capable of producing naturally because the company is unable to obtain artificial-lifting equipment. Federal oil authorities have twice denied application of the company for exception to M-68, permitting it to install pumping equipment on two wells. Testimony supporting the unsuccessful efforts of the company to obtain relief was placed in the Railroad Commission records at Austin last week.

"The East Texas field," Robert E. Allen, assistant deputy coordinator, advised the Sun company, "is capable of sustaining and even exceeding its present production rate without the use of additional equipment. There is a scarcity of pumping equipment for fields which cannot maintain their production rates without it. For these reasons it is neither in the public interest nor in the interest of the war effort to install the equipment as applied for."

Experience of Sun Oil Co. and the expressed policy of the Office of Petroleum Coordinator were taken together in Texas last week as additional arguments for abolishment of the individual-well allowables and substituting lease allocations. Presumably, details of preventing inequitable drainage as between leases would be a matter for the Railroad Commission to regulate.

Refusal of OPC, as the petroleum branch of War Production Board, to grant M-68 exceptions for the installation of pumping equipment on producing wells spaced more closely than one to each 10 acres may be the means to an end. Reports were circulated from Washington 3 weeks ago that OPC was giving serious consideration to methods of "thinning out" East Texas wells in order to free casing and other critical materials for installation in other less densely drilled fields. Considerable speculation followed the report on OPC intentions on how a program of "selective abandonment" could be enforced without creating insurmountable inequities.

Agitation among substantial elements of the Texas producers for adoption of lease allowables may indicate that OPC is depending on natural depletion and M-68 to accomplish its objectives. Operators of wells which cease to flow and for which they can obtain no pumping equipment would, it is conceded by practical producers, be receptive to pulling pipe and using it elsewhere, providing allowable of the abandoned well could be transferred to another on the same lease. On the other hand, operators would be reluctant to abandon wells that possibly have a few to several years of pumping life ahead if the temporary unavailability of a pumping jack, rods and a power is the only mitigating factor.

Nation-wide implication of the conditions confronting Sun Oil Co. on its East Texas lease were pointed out by other oil men appearing before the Railroad Commission. Advisers warned that conditions similar to those currently confronting Sun on one East Texas lease will be found in an increasing degree in that field and throughout the state in months to come.

Meanwhile, a majority of Texas operators continued their agitation for a state-wide hearing at which the problem of lease quotas substituted for well allowables would be threshed out and at which specific representations would be made to the commission.

LOUISIANA

A STATE-WIDE HEARING will be held in New Orleans, October 20, for the purpose of taking evidence relative to market demand from producers and purchasers of crude oil and natural gas preparatory to setting allowables for the 61-day period of November and December.

All purchasers of crude and natural gas are requested to present evidence at such hearing, or file notarized briefs by registered mail setting out their nominations, in *triplicate*, for the 61 days.

AN ORDER setting up a gas-oil ratio of 200 cu. ft. of gas per barrel of oil produced from wells in Louisiana, not presently affected by special orders, will be issued in the near future by Joseph L. McHugh, conservation commissioner, he stated last week at a state-wide hearing called in the interest of natural-gas conservation in the state. Under the new ratio a wastage of 200 million cubic feet of natural gas daily will be eliminated, it is estimated.

ILLINOIS

PROTESTS AGAINST THE OCTOBER quota of 280,000 bbl. daily of all petroleum liquids, certified by the Office of Petroleum Coordinator to Illinois, have been lodged by Robert Medill, director of mines and minerals.

"You have specified," Mr. Medill wrote Robert E. Allen, assistant deputy coordinator, "that not more than 280,000 bbl. of all petroleum liquids be produced daily, whereas our current production is in excess of this amount, according to crude-oil purchasers who furnish us with monthly statements of their daily average runs.

"We submit, herewith, the daily average oil production, the production of other petroleum liquids and the total production of all liquids daily as compiled from the reports of 38 purchasers. Already we have received some requests from crude-oil purchasers of contemplated increases in the volume that they will take during October."

PERMIT AND PRODUCTION DATA ON ILLINOIS

	Permits	OPC quota	Crude oil	Other liquid products	Total
Jan.	95	.....	376,053	.....	.....
Feb.	84	.....	351,400	.....	.....
Mar.	120	.....	322,200	.....	.....
Apr.	143	.....	317,969	4,501	322,470
May	187	329,200	298,867	8,534	307,401
June	267	320,800	295,210	2,167	297,377
July	262	304,100	288,082	4,421	292,503
Aug.	191	289,300	290,311	4,103	294,414
Sept.	312	289,200	.....	.....	.....
Oct.	...	280,000	.....	.....	.....

KANSAS

GAS PRODUCERS and purchasers in the Kansas portion of the Hugoton field have been called to a Corporation Commission hearing at the Warren Hotel, Liberal, Kans., at 10 a.m., October 13. Matters pertinent to the production, marketing and transportation of natural gas in the Hugoton field are scheduled for discussion.

The hearing notice from Jeff A. Robertson, chairman of the commission, did not stipulate that a proration order would be submitted for discussion. However, it was generally understood that the Kansas commission has prepared a tentative plan of operation.

HIGHEST ALLOWABLE in the history of Kansas' petroleum industry was authorized for October in the new proration schedule issued last week. Daily production of 294,000 bbl. daily was authorized, coinciding with the OPC recomemndation. Unprorated fields were assigned 53,150 bbl. of the state's daily average output while natural-gasoline plants and condensate fields were accorded 4,800 bbl. of the authorized production.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Official Observations

The past week brought analyses and resolutions regarding the present and the future needs of the petroleum industry from federal and state officials who have been in close touch with conditions for several years.

At A.I.M.E.'s St. Louis meeting, Petroleum Coordinator Ickes said today's present 4,000,000-bbl. daily output of petroleum liquid would have to be continued "because it is necessary to refine this quantity of crude oil in order to secure the needed amounts of 100-octane gasoline for our fighting planes, toluene for TNT, butadiene for synthetic rubber, and fuel oils to heat our homes as well as run our war industries."

The National Conference of Petroleum Regulatory Bodies at Chicago said, "the nation is on the brink of an oil shortage due to lack of drilling and to avert such shortage provision should be made at an early date for an increase in price on crude whereby the producers may be given an added incentive for making discoveries."

Finally, members of the Interstate Oil Compact Commission emphasized that the industry must have greater supplies of materials if it is to assure this country adequate petroleum to carry on a successful war.

The industry's coordinator with all the present and future requirements of the United Nations before him, knows that any curtailment of civilian use in this country will be wholly or largely offset by expanded war needs with the possibility that a shutting off of supplies in other parts of the world will expand requirements from domestic fields and refineries to record levels.

The outspoken coordinator also made clear in his contacts at St. Louis and Chicago that he is fully cognizant that producers of crude oil have not been given the consideration to which they are entitled in the matter of price. Aside from the injustice to the operators, he also knows that a continuance of this policy of freezing prices at prewar levels, will lead inescapably to a critical shortage of one of the most essential products of the war.

The reports of representatives of the state regulatory bodies which are closer to what is going on in the fields than any other governmental agency were also convincing. These bodies know what happens when the drill stops and new reserves are not found and produced to offset the steady decline in existing fields.

It would be time well spent in connection with the war plans of 6 months and a year from now if representatives of WPB, OPA, the Navy, and the Army would go to the state capitols and study the records of the conservation commissions covering production trends in large and small fields over a period of several years. They would find that it is the steady flow of flush production from newly developed areas that enables this industry to keep pace with the demands of its customers.

The conservation officials are fully aware that sacrifices in production practices must be made by the oil operators in their states as a contribution to the war plans. They have given full support to unitization and all other programs which seek to obtain the maximum quantities of petroleum with a minimum expenditure of critical materials.

At the same time, through their daily contacts with field operations, they realize that there is a definite limit to what can be done in curtailing normal operations if the United Nations are to be supplied with petroleum throughout this conflict. Long experience and not theory has taught them that the same rules of production apply to petroleum as prevail in agricultural and other industries with restrictions in manpower, activity, and materials certain to be reflected in lowered output.

Mr. Ickes and the membership of the state regulatory commissions were completely right in their declarations. They should continue their forthrightness until Washington listens and acts.

Compact Urges Modern Laws To Conserve Natural Gas

By HARRY F. SIMONS

CHICAGO, Ill.—Recommendations that the states modernize their laws to make more effective the conservation of natural gas and facilitate the organization of pressure maintenance and secondary-recovery programs, were considered by the Interstate Oil Compact Commission at its closing session at the Palmer House here October 3. During the 2-day meeting, representatives of the various states and members of the petroleum industry heard discussions on gas reserves, distribution, and use of natural gas.

Those attending the Friday session were treated to a surprise visit from Harold L. Ickes, petroleum coordinator, who talked frankly about the present situation as it affects oil and gas. Mr. Ickes expressed appreciation to the compact committee, state regulatory bodies and men in the industry for their cooperation in recent months.

Costs accrued by the industry as the result of lowering gasoline and increasing fuel-oil yields have not yet been computed but this added to the burden of increased transportation costs for crude and products going to the East Coast threatens to wreck the industry unless something is done in the near future, according to Mr. Ickes. He said the industry was making an admirable contribution to the war effort although running the risks of bankruptcy while doing it.

Gov. Leon C. Phillips, Oklahoma, assured Coordinator Ickes of the cooperation of the Compact Commission and of the men in the industry in his efforts to keep the vital supply of petroleum and its products flowing into the war effort.

Gov. Payne Ratner of Kansas and Gov. Dwight H. Green of Illinois attended the meeting. Governor Ratner was forceful in his criticism of incompetence and delay in handling situations arising from the war. In regard to rubber, Governor Ratner said: "The farmers of Kansas and other states are not concerned with how rubber is made, nor with the products used. What they want and need is rubber itself. The oil industry has made it clear that the end, not the means is important. The oil industry has just one plea in this regard: 'Let's have rubber, by the quickest and most practical means available'."

Report of the regulatory practices committee included recommendations for a separate gas statute which would be similiar in all states but which would provide for local conditions within states and which would regulate the production of natural gas at its source. Further study of the regulation of dry natural gas, distillate and casinghead gas was suggested along with a study of the regulations and legislation needed to effect storage of natural gas in depleted reservoirs.

The legal committee made similar recommendations except it went into detail to include along with separate laws governing gas regulation at the source, common-purchaser and common-carrier provisions and the elimination of outmoded regulations now on the statute books.

The report of the research and coordinating committee relating to the conservation and utilization of natural gas pointed out that gas wastage has been materially reduced through effective gas-oil ratio control in oil fields and utilization of cycling, natural-gasoline plants, gas-marketing facilities, industrial plants, chemical plants, pressure-maintenance and secondary-recovery operations. Despite improvement in the conservation of natural gas, some oil fields are being operated with inefficient gas-oil ratios and some are without facilities for utilizing the gas.

The resolutions committee recommended to the compact that state laws be revised to encourage pressure maintenance and secondary-recovery projects.

The comprehensive technical program on gas included a paper, "A Survey of Present and Potential Gas Reserves," by Ralph E. Davis, consulting engineer, Pittsburgh, Pa. This paper is presented in full in Pages 35, 36, 37 of this issue.

N. C. McGowen, president United Gas Pipe Line Co., Shreveport, La., talked on "Natural Gas Distribution," and E. H. Poe, director of the OPC Natural Gasoline and Natural Gas Division, discussed the need of legal revisions to permit greater gas production to meet anticipated shortages.

H. W. Bell, director Division of Minerals for Louisiana, discussed the gas resources in the state in his paper, "Conservation of Gas in Louisiana."

At the Saturday morning session G. L. Brennan, manager of liquefied petroleum gas division, Warren Petroleum Corp., Tulsa, discussed "The Development of Liquefied Petroleum Gas Industry," and Dr. Gustav Egloff, director of research, Universal Oil Products Co., Chicago, talked on "Present and Future Gas Utilization for Synthetic Products."

Regulators Ask Central Control

THE National Conference of Petroleum Regulatory Authorities meeting in Chicago, Ill., last week, heard talks by Don R. Knowlton, OPC director of production, and Robert L. Allen, assistant deputy coordinator and in addition voted on resolutions concerning conduct of the petroleum business during the war.

Most direct was the resolution ordered sent to President Roosevelt and the heads of OPC, WPB and OPA which suggested that federal authority for petroleum regulation be placed under one head and that the regulation be materially simplified. The introduction of this resolution pointed out that the present confusion resulting from interference was damaging to the war effort.

"This multiplicity of agencies," the resolution declared, "causes confusion within the industry and within the states, leaving uncertain the agencies to which state regulatory bodies and the petroleum industry may look for proper authority and direction in the conduct of the war effort, which confusion results in the impairment of the war effort with relation to petroleum. We suggest the concentration of as many of these separate authorities over petroleum as possible under one administrator, and suggest that administrator should be present Petroleum Coordinator Harold L. Ickes," the resolution read.

The regulatory authorities conference also recommended: (1) That provisions be made at an early date for an increase in the price of crude oil which would encourage exploratory drilling; (2) that where regulations may be made affecting the gasoline rationing program they should be confined to such consumers as will effect a saving of rubber, that other consumers not be rationed, and that provisions be made for operation of rural, agricultural and petroleum industries; (3) in addition to present priority allowance for exploratory work it is necessary that the petroleum industry be furnished all necessary supplies for exploration and development of reserves; (4) the adoption of Lease Form 88 by the Government for leases on government land and the reduction from 1/6 royalty to the 1/8 royalty customary in the oil industry.

Those attending the meeting were told that from a purely analytical standpoint, we are running out of oil and that present oil aboveground is definitely below demands for the reasonably near future. The reserve picture is not being improved according to one speaker, who said, "We need to discover a 30,000,000-bbl. field every month and we are not doing one-third that."

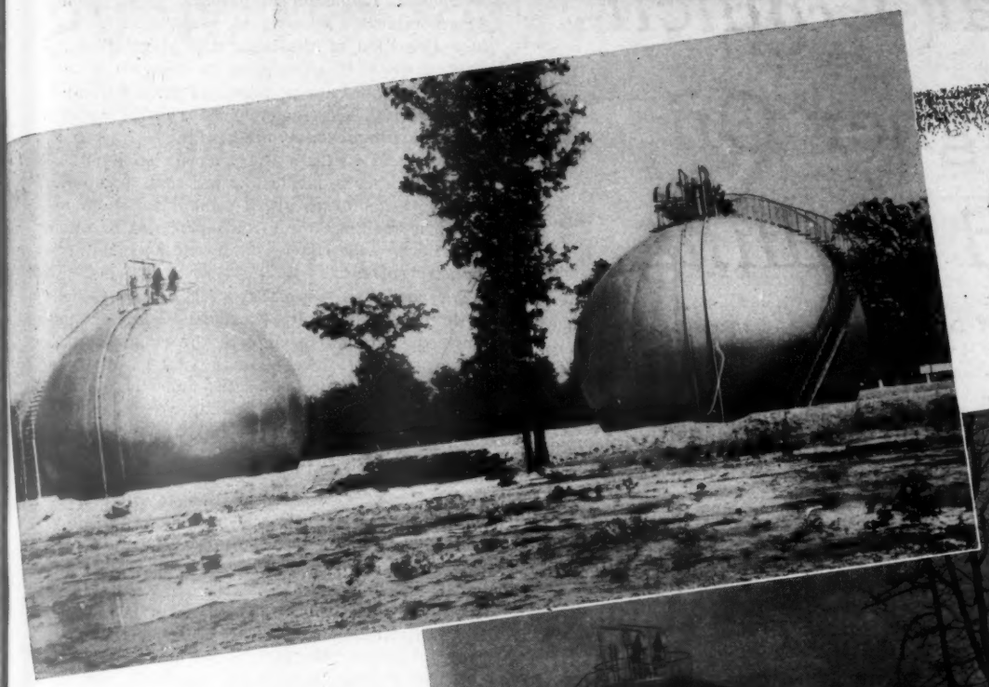
President Expected to Issue Order Creating Centralized Petroleum Agency

WASHINGTON, D. C.—President Roosevelt is expected soon to issue an executive order combining in one agency all federal activities relating to petroleum.

This was forecast in a letter the president sent to Senator Lodge of Massachusetts commenting on the bill the senator introduced to create a petroleum administration. The president said he agrees with the purpose and intensive study is now being made as to the best form of agency, but that he has sufficient executive power and new legislation is unnecessary.

This may be taken as confirmation of a report that Petroleum Coordinator Ickes has told the White House either he must have more authority or some new agency must be created to handle all oil matters. While many agencies now handle oil matters and are only nominally subject to coordination by Mr. Ickes, the chief friction has been with OPA over rationing, and particularly price adjustments, and with WPB over steel requirements.

HORTONSPHEROIDS



IN SUMMER

IN WINTER

"Eliminate vapor losses when temperatures vary

A MAJOR cause of vapor losses in the storage of volatile petroleum products is the variation between daytime and nighttime temperatures . . a condition often as pronounced during winter months as at other times of the year.

Positive protection against vapor losses is assured when volatiles are stored in Hortonspheroids because *no vapor escapes* when temperatures change. These pressure vessels are designed to withstand the pressures that will result from normal temperature variations. Thus, Hortonspheroids eliminate breathing and boiling losses by eliminating venting—no vapor escapes into the atmosphere and no air is admitted to the vapor space. When temperatures rise the pressure in the vapor space builds up until it equals the vapor pressure of the liquid at that temperature. As temperatures drop, vapor pressure is reduced and excess vapor condenses.

Plain Hortonspheroids have been built in capacities from 2,500 to 40,000 bbls. for gauge pressures as high as 35 lbs. per sq. in. Noded Hortonspheroids are recommended for larger capacities (20,000 to 100,000 bbls.) to operate at pressures up to 20 lbs. per sq. in.

The two Hortonspheroids illustrated are 5,000-bbl. units, part of the pressure storage facilities at a Texas recycling plant. One operates at 15 lbs. per sq. in. pressure and the other at 20 lbs. per sq. in. pressure.

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Industry War Council Calls for Higher Oil Price to Aid Drilling

By HENRY D. RALPH

WASHINGTON, D. C.—A resolution calling for a substantial increase in prices of crude and petroleum products to stimulate discovery and production was adopted by the Petroleum Industry War Council at the opening session of its monthly meeting October 6.

The resolution drafted Monday by the production group of the council declared that current demands for petroleum are depleting known reserves at a rate substantially in excess of discoveries and the nation faces a serious threat of shortage. While certain areas can increase production without waste, total increase possible may not be sufficient to supply anticipated war demands and present crude-oil prices do not provide sufficient funds or incentive for exploration.

The resolution asked that a substantial increase in crude-oil prices and corresponding increases in the wholesale prices of refined products and in the retail prices to ultimate consumers be made effective immediately and that increases be sufficient to stimulate discovery and compensate for increased costs. The resolution also asked that necessary materials for production be made available and that definite government policy be adopted to recognize changed conditions affecting the oil industry.

Economics Report Adopted

The council adopted the report of committee on petroleum economics calling for immediate and drastic changes in refinery yields to reduce gasoline production and increase fuel oil. The committee said the supply situation in the East is worse than anticipated in its last monthly report because of failure to follow its recommendations for increased tank-car shipments and changes in refinery yields. Tank-car deliveries fell far short of anticipated 970,000 bbl. daily, but operation of Directive 59 may improve the situation. The committee estimated tank-car deliveries to District 1 must be 900,000 bbl. daily in October, 950,000 in November, 900,000 in December and average 987,000 in the first quarter of 1943 in order to meet minimum essential demands of around 1,300,000 bbl. daily. It assumes tanker deliveries of only 100,000 bbl. daily for remainder of this year and 40,000 bbl. next year.

Failure to follow recommendations for changing refinery yields has resulted in larger shipments of gasoline to District 1 than anticipated and smaller receipts of kerosene and fuel oil. Considering effects of the Baruch report and new tank-car controls, the committee estimated it should be possible to supply all rationed gasoline demand in Districts 1, 2, 3 and 4 (District 5 figures were not received in time for inclusion in report); all distillate, kerosene and residual requirements for nonheating purposes in the four districts; all heating-oil requirements in Districts 3 and 4 and about 80 per cent of those in Districts 1 and 2 if this is a normal winter. If winter is 4 per cent colder than normal only 75 per cent of heating requirements can be met.

Estimates can be met only if tank-car efficiency is improved and particularly if refinery runs are adjusted. The committee said the refining situation is fully as important as transportation but has not received adequate consideration. Further drastic changes must be made to reduce gasoline yields so as not to exceed rationed demand or a serious situation will result with overproduction of gasoline in the four districts of 200,000 bbl. daily, with accumulation all in Districts 1, 2 and 3.

Failure to adjust yields would mean a heating-oil shortage of more than 200,000 bbl. per day and shortage of at least 50 per cent in some heating demands in Districts 2 and 3. The committee said: "Such an occurrence would be a major disaster which can only be averted by prompt action to secure the necessary yield adjustments. Reduction in gasoline yields should be accomplished as early as possible in October in anticipation of the beginning of gasoline rationing since, if adjustment is delayed, it will have to be more drastic later and more difficult."

Refinery yields recommended by the committee to start immediately are gasoline 36.1 per cent, kerosene and distillate 24.4 per cent, residual 25.3 per cent, other products 14.2 per cent. To accomplish this committee urged prompt action to adjust price ceilings for refined products or other action to provide compensation and keep refinery industry solvent.

The committee estimated effect of the Baruch recommendations will reduce passenger-car gasoline consumption throughout the country to 52 per cent of 1941 level, though total gasoline demand will not be reduced this much because of military and civilian nonpassenger-car use. The report pointed out that rationed demand in District 1 had been estimated at 530,000 bbl. of gasoline daily but in the first 2 months of rationing actual deliveries from terminals were 510,000 bbl., though in the week ended September 26 deliveries were down to 440,000 bbl.

The committee recommended crude-oil production to meet its estimates of demand as follows: October, District 1, 79,000 bbl. daily; District 2, 1,062,000; District 3, 1,771,000; District 4, 118,000 bbl. November, District 1, 79,000 bbl.; District 2, 1,052,000; District 3, 1,830,000; District 4, 118,000. December, District 1, 79,000 bbl. daily; District 2, 1,041,000; District 3, 1,790,000; District 4, 118,000 bbl. First quarter 1943, District 1, 79,000 bbl. daily; District 2, 1,031,000; District 2, 1,812,000; District 4, 118,000 bbl.

Power Association Calls Off Annual Conference; Will Hold Short Business Session

At a meeting of the board of directors of the Petroleum Electric Power Association in Dallas, Tex., October 2, it was decided not to hold the regular annual conference of the association this year. The annual conference is usually held in December each year, but this year the desirability of keeping travel to a minimum, and also due to the fact that the petroleum industry, electric manufacturers and the electric utility industry have about all they can do to meet the demands incident to the war program, it was decided to forego the annual convention.

However, there will be a 1-day streamlined conference of the member-company representatives at the Baker Hotel in Dallas, Tex., November 12. This meeting is for the purpose of transacting association business and for electing officers for the coming year. This will be a strictly business meeting and such industry matters that may be discussed will be for the purpose of making a greater contribution to winning the war.

Request for Extension of Big Line East Being Made

WASHINGTON, D. C.—OPC will soon make a new request to WPB for authorization to continue the 24-in. War Emergency line eastward to Philadelphia and Bayonne, it was learned October 6.

When the western half of the line from East Texas to southern Illinois was approved, WPB announced that the matter of extending it eastward would be reconsidered this fall in the light of existing conditions of steel supply and transportation facilities. OPC is now completing an extensive study of oil-transportation conditions and will submit this to WPB shortly together with a finding that eastern demands cannot be met without completion of the big line.

ODT Orders Tank Cars Returned Promptly to Points of Origin

WASHINGTON, D. C.—All common carrier railroads have been ordered by Office of Defense Transportation to return tank cars to their "last point of origin" immediately after unloading, unless other provision has been made for their disposal.

Effective October 10, this order (Special Direction ODT 7-1) is expected to save many thousand car-days monthly for transportation of petroleum and products to the East and movement of other war-essential materials which move by tank car, ODT said.

Suppliers to Distribute Fuel-Ration Coupons to Customers

WASHINGTON, D. C.—Fuel-oil dealers in the 30 rationed states will distribute ration applications to their customers, OPA announced this week. Dealers must register with their local ration boards during the coming week and report September 30 inventories. They will receive consumer blanks to send customers together with certified statement of customer's purchases last year.

Consumers may mail in applications and receive coupon books later. Meanwhile, consumers may purchase only by signing promissory notes agreeing to deliver coupons to dealers when available.

The rationing plan will divide the heating season into five periods to enable home-heating oil consumers to budget their supplies throughout the winter.

Army, Navy Officials Want New Discoveries to Assure Supply

WASHINGTON, D. C.—High-ranking Army and Navy officials told the war minerals subcommittee of the Senate public lands committee that the petroleum requirements of both services are increasing daily, and that unless something is done to promote discovery of oil, these increased demands will cause "heavy" withdrawals from reserves.

They were Brig. Gen. Walter B. Pyron and Capt. A. T. Carter, oil experts of their respective services, who opened the hearings of the committee whose purpose it is to "develop the facts and see what's to be done about the decreasing discovery rate," according to its chairman, Senator O'Mahoney, of Wyoming.

General Pyron indicated that the West Coast is facing an actual shortage, possibly not in 1943 and 1944, but "if the war lasts too long." Captain Carter said that by the end of 1943 the Navy's requirements, particularly on the West Coast, may be doubled, and added that it is "imperative" that search for new reserves be stimulated.

Mid-Continent Deficient

Robert E. Allen, assistant deputy petroleum coordinator, told the committee, further, that the Mid-Continent is not now producing enough oil for its own demands and its contribution to the East. Virtually all committee members and representatives of interested government departments were in agreement as to need for new oil discoveries and most of them indicated that an increase in the price of crude was one of the major incentives that could be given exploration. Leon Henderson, price administrator, did not commit himself on this phase, however.

"Even with a land as rich in oil prospects as ours, there is an urgent need for 'seed' money or there will be a short crop of oil a few years hence," declared A. I. Levorsen, Tulsa geologist and past president of the American Association of Petroleum Geologists. He concluded his prepared presentation with:

"Something must be done to stimulate wildcat drilling. This can be done, in my opinion, by increasing the price of oil to such a point as to provide income from which exploration money may be obtained in a sufficient amount to double the wildcat drilling. And, if doubling the effort does not make the necessary discovery, then enough to treble it, because I feel that we have every reason to believe that the oil is there to be discovered if we will but make the effort necessary to find it."

Mr. Levorsen's statement as one of the first two witnesses to be presented by the Independent Petroleum Association of America, discussed at length the nature of the country's petroleum reserve, both developed and undeveloped, and declared that the latter was the "crux of the entire reserve problem."

Pointing to the experience of other oil producing countries whose discoveries, with few exceptions, have been negligible in comparison to their possibilities, he said this situation is "undoubtedly due more than any other reason to the absence of the small operator or the independent," since there is virtually no incentive to take the risks necessary to drill the wildcat from which come discovery.

Another I.P.A.A. witness was Ralph T. Zook, Bradford, Pa., who explained the problems of secondary and "stripper" recovery to the committee members. He is a member of the I.P.A.A. executive committee and vice president for Pennsylvania of the National Stripper Well Association, in whose behalf he also appeared.

Zook Urges Price Incentive

In his statement, Mr. Zook made the following points (as summarized by him at the completion of his testimony):

1. There are immense reserves available for secondary recovery.

2. The production from these reserves depends almost entirely upon the continued production from the stripper wells until such a time as those areas which are favorable for exploitation under present or improved conditions of secondary recovery can be developed and research work carried on to make available the reserves from less favorable properties.

3. Secondary recovery is not a haphazard technique which can be used with immediate favorable results on all property and only by the closest technical supervision can profitable operations be anticipated and losses reduced to a minimum.

4. Time is required and while there are reserves of great magnitude, they are not immediately available and time will be required to build the production from this source to the maximum.

5. Last and most important, an increase in price for crude oil is necessary to maintain the stripper wells and furnish funds for research and development under secondary recovery.

Lahee Reviews Reserves

Other witnesses scheduled to be put on the stand by I.P.A.A. were Frank Buttram, Charles F. Roeser, former president, and Harold B. Fell, executive vice president.

F. H. Lahee, chief geologist of the Sun Oil Co. and vice chairman of A.P.I. committee of reserves, described for the committee the methods used by his committee in estimating reserves, told of the sharp decline in the number of barrels of production from the number of wildcat holes drilled in the past 5 years, and declared that "discovery of new pools is going to be increasingly difficult, and we'll have to take more time and more money to discover new reserves The more conspicuous fields already have been discovered."

Asked for suggestion as to what would be done, Mr. Lahee said that he believes federal lands as yet unexplored might yield good pools, and that an increase in the price of crude oil to increase wildcatting would be well justified.

The subcommittee holding the hearings includes Senators O'Mahoney (Wyo.), Hatch (N. M.), Gurney (S. D.), Thomas (Idaho) and Murdock (Utah).

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Commission's Report on Mexico Expected Shortly

NEW YORK.—The United States commission which has been making a survey of the Mexican oil industry is expected to return to Washington shortly to make its report. The commission is headed by E. L. DeGolyer.

The group is expected to make a report on what equipment and materials will be needed to rehabilitate the Mexican oil industry, from the standpoint of oil-field development and refining operations.

After the committee has rendered its report it will be up to the War Production Board and other government agencies concerned to determine whether the needed supplies can be spared from American supplies.

Re-laying of some of the existing pipe lines in Mexico to comprise a direct route from the Tampico oil fields to the Texas border is said to be under discussion.

Production of crude oil by Petroleos Mexicanos, the Mexican Government agency, during August dropped to the lowest level in the country's post-expropriation operations, averaging 77,410 bbl. daily. Output in July averaged 90,079 bbl. daily. A year ago, Petromex produced a daily average of 97,465 bbl.

PRODUCTION BY FIELDS

(Figures in barrels)

	1942		1941
	August	July	August
North Tampico	174,711	269,023	385,231
South Tampico	129,260	251,072	375,230
Poza Rica	1,663,771	1,836,353	1,768,037
Isthmus fields	432,022	436,023	492,922
Total	2,399,704	2,792,471	3,021,420
Daily average	77,410	90,079	97,465

Chief declines, the table shows, have been suffered by North and South Tampico. Shortages of materials, lack of skilled engineers and slumps in demand because of the war have been factors chiefly responsible for the drop in producing operations.

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Bareco Refinery at Corpus Christi Sold to U.S. Engineer Department

THE U. S. Engineer Department has purchased the refinery of the Bareco Oil Co. at Corpus Christi, Tex. The refinery will be removed to another location to serve a "vital war project." Bechtel-Price-Callahan of San Francisco, Calif., acted as agents for the Government in making the purchase.

The plant at Corpus Christi was built by the Barnsdall Refining Co., predecessor of the Bareco Oil Co., in 1937. The refinery has a skimming capacity of 10,000 bbl. daily and a modern cracking plant of the Dubbs type with a daily charging capacity of 5,000 bbl. The refinery has tanker-loading facilities and since its completion has disposed of a large part of the plant output to foreign and coastwise customers. It is connected to fields in Southwest Texas by a pipe line owned by the Barnsdall Oil Co.

The refinery will continue operations until October 15. The purchasers expect to have the plant dismantled by the first of the year. The purchase includes storage as well as plant facilities. O. L. Cordell, Tulsa, is president of the Bareco company which will continue to operate its refining properties at Barnsdall, Okla., and Wichita, Kans., and marketing facilities at points in the Mid-Continent and Middle West.

Their roots are sprouting SYNTHETIC RUBBER 10,000 miles away

Thousands of rubber trees have been destroyed in the Far East; it will take years to regrow them. Japan can't hold the rubber groves and the huge raw rubber stocks she has seized, so she probably will destroy them. These dark clouds have a silver lining in synthetic rubbers —made wholly in America, totally by American labor, and serving all America better than tree rubber ever did.

Hycar synthetic rubbers were being produced long before Pearl Harbor. But the war, shutting off the supply of crude rubber, was a stimulus that is bringing astonishing results in chemical research and production of Hycar synthetic rubbers that are vastly superior to tree rubber.

Of course, rubber stocks must be zealously conserved. The needs of the United Nations are tremendous. They get first call on every existing scrap of rubber and on every pound of synthetic rubber produced.

Hycar laboratories are ceaselessly exploring, testing, and developing new formulas and processes. Hycar synthetic rubbers are being manufactured that have marked superiorities over tree rubber and many plastic products. Some of these advantages are better tensile strength and electrical properties; greater resistance to age and harmful effects of oxygen, sunlight and heat.

Certain Hycar compounds, though light in weight and impervious to oil, withstand severe flexing—a combination particularly valuable in bombers and fighting planes. Other Hycar types have unusual resistance to abrasion, a property highly desirable in tires and tank tracks.

Hycar is a raw material furnished to manufacturers of finished rubber products. Your rubber supplier can explain Hycar's advantages. If you are producing a war essential, our chemists and engineers will be glad to cooperate and help on rubber problems. HYCAR CHEMICAL COMPANY, Akron, Ohio.

Built to Beat the Elements that Destroy

Hycar, the synthetic rubber that's made from oil, can be compounded to give you greatest resistance to the combination of oil, heat, and abrasion, highly destructive to most resilient materials. This means that pump piston rings, hose lining, gaskets, all types of seals, and many other important maintenance articles last longer with less time and cost spent on replacement, when you specify they be made of Hycar.

HYCAR *thetic* **Rubber**

LARGEST INDEPENDENT PRODUCER IN AMERICA OF BUTADIENE SYNTHETIC RUBBER

Availability of Gas Pertinent to Study of Supply and Reserves

By RALPH E. DAVIS

This review of natural-gas resources presented at last week's meeting of the Interstate Oil Compact Commission at Chicago, Ill., features the abundant reserves in the Texas Gulf Coast region which is just beginning to receive the attention it deserves.

Ralph E. Davis, the author, is one of the country's outstanding authorities on the subject of natural-gas supplies and reserves. He is an engineer and geologist of Pittsburgh, Pa., and in his professional pursuits has been in intimate contact with the subject here treated for a number of years.

WHEN one studies the gas reserves of a given field or of a given region it frequently becomes apparent to him that the total reserve may be great, measured in units of cubic feet or in units of years' supply, but that a closely related question is often of very great importance, that is, the question of capacity to produce during a given interval of time. Inasmuch as the question of production capacity is becoming so important in certain fields and regions, I propose to discuss not merely the question of known reserves and prospective reserves but also the question of availability of the gas, for unless these two matters are considered together it is quite possible that erroneous conclusions may be reached.

At the outset I think it well to look at the history of natural-gas production in the United States. From a practical standpoint important production began, I believe, about 1885, although minor quantities of gas were produced even prior to the drilling of the Drake well in 1859. The natural-gas industry grew up as an adjunct to the oil industry and throughout the nation, with notable exceptions, the discovery of gas and the development of gas have, to a great degree, resulted from the search for oil.

Production History

According to the Bureau of Mines the total production of natural gas in the United States, delivered to consumers in the period 1906 to 1940, inclusive was 42,322 billion cubic feet. To this we may add at least 25 per cent for gas lost or wasted. In 1906 the total marketed production is stated at approximately 389 billion cubic feet. In 1940 the total marketed production was approximately 2,655 billion cubic feet. This includes gas used in the field, but does not include gas wasted, estimated by the Bureau of Mines at 656 billion cubic feet or about 20 per cent of the total. These figures do not include gas placed in storage or used in repressuring, as this gas should eventually be largely recoverable. No record is available to me of the total gas produced prior to 1906, and inasmuch as great quantities of gas have been wasted, particularly in the early years of oil development, no one will ever know what the total past production of the nation has been. During recent years notable progress has been made in the conservation of natural gas, and for two reasons. The value of the gas and the fact that it is an irreplaceable wasting resource, also its importance in efficient oil production, have been more widely recognized. From my studies I am satisfied that to the end of 1940 the total production has been well in excess of 60 trillion cubic feet and, if the figure is brought down to date, the total has been in excess of 65 trillion cubic feet. This figure is of importance when giving consideration to present reserves known and potential, for if we have some knowledge of the total past production of the country and of the extent to which proven reserves today exceed the proven reserves of any previous year we have in our hands a very crude yardstick to test the reasonableness of reserve estimates that may depend upon highly technical geological or engineering approaches. The known reserves today are greater than in the previous year. This statement is based upon the fact that in every recent year very substantial additions to the known natural-gas reserves have been made and in amounts annually exceeding the total gas withdrawals. For example, within the last 2 or 3 years very notable discoveries of large reservoirs filled with gas at very high pressure have been found along the Wilcox trend in a belt that crosses South-Central Louisiana and South Texas, and exploration along this trend is in an early stage. Deep drilling along the Gulf coastal plain in both South Louisiana and in Texas has added enormously to known reserves within the past 5 to 10 years. In the region of the Sabine uplift proven reserves today are substantially greater than were known in 1930. No one familiar with this development will deny that known gas reserves of the nation have been climbing from year to year and at a substantial rate.

In order to give a picture of the total known reserves I have divided the country into five districts: the Appalachian, the North Central, the Mid-Continent-Gulf Coast, the Rocky Mountain, and California.

Appalachian Area

The Appalachian gas fields are generally regarded as including the gas-producing areas in New York State, Pennsylvania, West Virginia, Ohio, and Kentucky. From a geologist's standpoint it would be proper to include the gas-producing area of southern Ontario as this is merely a northerly extension of the same general natural-gas region.

The total production of the region, exclusive of Ontario, from 1906 to 1940 is given by the Bureau of Mines at 12,781 billion cubic feet. This figure includes all gas marketed of which there is a record but it does not include gas wasted. The total gas marketed in the year 1906 was 306 billion cubic feet. Inasmuch as the industry has been growing gradually from about 1885, it is reasonable to estimate the marketed production prior to 1906 at approximately 3,000 billion cubic feet. These figures indicate that the total production to the end of 1940, exclusive of gas wastage, was of the order of 16 trillion cubic feet. Gas of this region has been obtained from more than 30 separate producing horizons, although it is exceptional when more than two or three pay zones are found productive in any one well. The total number of separate pools that have been discovered is of the order of 1,500. The total marketed production in 1940 was 385 billion cubic feet. In 1941 production was probably slightly in excess of 400 billion cubic feet. Many of the pools have been wholly or largely depleted while a relatively small number are still in the early stage of their productive history. It would be an enormous undertaking to review the Appalachian territory well by well or lease by lease to arrive at a reserve estimate, but based upon recent studies of a substantial portion of the whole, and giving consideration to the productive history of this region and to its present productive capacity, and knowing that the region generally has been widely although not completely tested by the drill, it is my judgment that present proven reserves are of the order of 5 trillion cubic feet and that potential reserves are of small magnitude even though commercially they will be very important.

Eastern Reservoirs Decl'ne

An accompanying chart reflects the production statistics in the Appalachian field for the period 1906 to 1940 in total and also by states. It will be noted that West Virginia has been the great reservoir for natural gas and that for some 25 years its production has been on the decline. The increase of the last 5 to 6 years has been due in part to increased markets for gas, and also in large part to notable discoveries of deeper gas in the Oriskany horizon. It is anticipated that production in West Virginia will shortly resume its downward trend.

The production in Pennsylvania, the second state in importance from the standpoint of gas supply, has been on a slow down trend since prior to 1906. The dip in production for the years 1931, 1932 and 1933 was occasioned by lessened market requirements while the increase in more recent years has been partly due to the increase in demand for gas, as well as to notable local discoveries of deeper gas in the Oriskany in northwestern Pennsylvania. It is anticipated that production in Pennsylvania will continue to decline.

The production in Ohio has been fairly well maintained since 1915, the year of peak production, fluctuating more or less synchronously with market demand. New pools, minor in size but substantial in number, are being currently discovered in Ohio, and it is anticipated that this development will continue for a number of years although the over-all production of the state is likely to continue a slow decline.

New York State has never been important in

the production of natural gas except from the local standpoint. Deep Oriskany gas was found in southwestern New York some 10 to 12 years ago, resulting in a great increase percentagewise in the natural-gas production of the state. Unfortunately, the New York State Public Service Commission permitted these fields to be rapidly depleted by the burning of gas for inferior purposes such as boiler fuel. The fields have been largely both expensive and discouraging. A shortage of natural gas in southwestern New York is at hand.

The production of gas in Kentucky is important mainly in the eastern part of the state. This is the last area of important natural-gas reservoirs of the Appalachian region to be brought into large-scale production. It is anticipated that Kentucky output will, to an important degree and for some years, partially replace the waning supply from the several other gas-producing states of the region.

Appalachian Search Pushed

Since Pearl Harbor, the effort to maintain productive capacity in the Appalachian region has been carried on at a feverish rate, except during the period of restricted drilling imposed by the War Production Board through the issuance of Order M-68. After some months of delay this order was modified and drilling is again very active. The gas deliveries in 1941 were greater than in 1940. The output in 1942 will doubtless equal the production in 1941 and it is hoped that deliveries in 1943 may be of a similar total, that is, in excess of 400 billion cubic feet for the region. A supplemental supply will be available through the linkup of the main line of Panhandle Eastern Pipe Line Co. with lines in Ohio of the Columbia Gas system, and additional lines are being projected from the South. Practically all of the industrial gas used in the Appalachian states today is in plants devoted to war purposes. Should the war last for more than another year or two it will in all probability bring about a critical situation in the natural-gas supply of this important consuming region, similar to, although surely not as critical as the situation which has already developed in southern Ontario. In this latter region it is physically impossible to supply the natural-gas needs of the war industries that heretofore have been served and at the same time meet the domestic requirements of those who until this year have depended upon natural gas.

The North-Central area, which includes Michigan, Indiana and Illinois, is a region in which natural-gas production has been of substantial importance locally although from the broad standpoint of the nation's reserves the quantity now known is relatively minor. The total marketed production from 1906 to 1940 approximated 270 billion cubic feet. The marketed production in 1940 approximately 22 billion cubic feet, of which a little more than one-half came from Michigan. In Michigan the natural gas being marketed is mainly from reservoirs which do not produce oil, hence conservation is effective. The discovery of additional gas reserves of this type is continuing with important areas yet to be adequately explored.

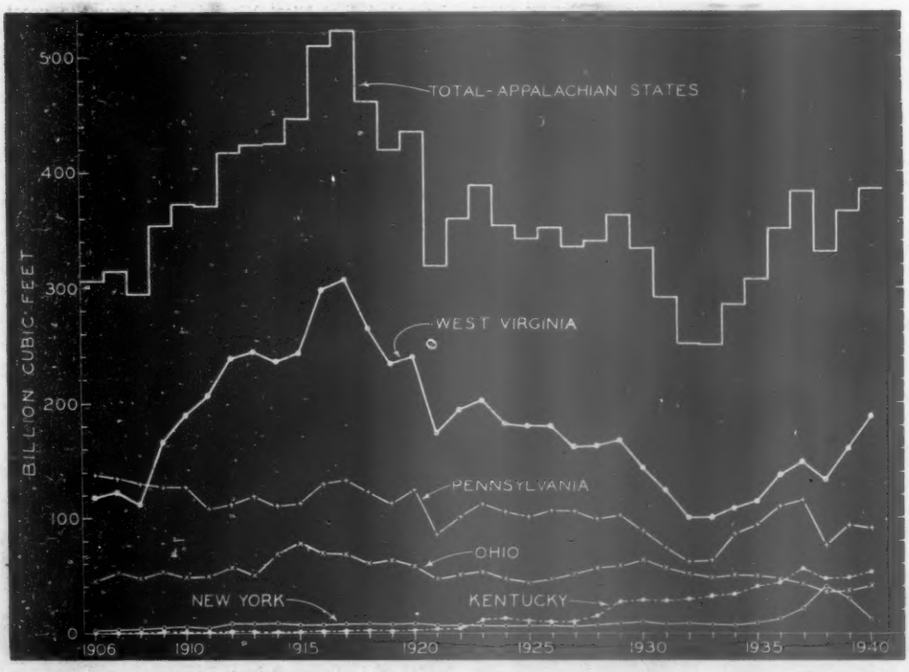
Natural gas in Illinois is obtained almost entirely from formations that produce oil. Progress has been made in repressuring, and recently this procedure has been more widely applied. Oilfield gas, largely wasted in the past few years, is thus being returned in increasing quantities to underground storage, and this will be an important factor in determining the ultimate availability of gas in the Illinois fields for pipe-line use.

The presently proven reserves in Indiana are minor in amount as compared to the two neighboring states of Michigan and Illinois.

The known recoverable-gas reserves of the three states are placed in this estimate at only 200 billion cubic feet, largely on account of the uncertainty of conservation becoming effective in Illinois. Prospective reserves are judged to be of similar amount.

Mid-Continent-Gulf Coast Region

The area referred to as the Mid-Continent-Gulf coastal region is recognized as the great storehouse of presently known natural-gas reserves. In it we include Texas, Louisiana, Arkansas, Oklahoma, Kansas and southeastern New Mexico. Other states bordering those named, such as Mississippi, Missouri, Nebraska and southeatern Colorado, might also properly be included, but the known gas reserves of these latter states are of no importance.



Natural gas produced in the Appalachian states and delivered to consumers. (Based on U. S. Bureau of Mines)

Eastern Kansas and northeastern Oklahoma have afforded substantial natural-gas production for a very long period—for so long a time in fact that the known reserves are now largely depleted. Important reserves of the order of 1 trillion cubic feet or more are known in southern and southwestern Oklahoma. There can be no doubt that additional substantial gas reserves will eventually be found in western and southwestern Oklahoma. Here the producing formations lie at great depth, exploration will be expensive and once the search for oil in the region proves to be satisfactory the ultimate discovery and development of the potential gas supplies of this region will doubtless involve a long-time period. Oklahoma is producing gas not only for its substantial local markets which have been augmented for the period of the war, but it is also supplying gas for export southward into North Texas and northeasterly into Kansas and Missouri.

Within the area usually referred to as the Mid-Continent oil and gas region enormous reserves have been discovered and partially developed in the great Amarillo and Hugoton fields situated in the Texas Panhandle, in the Oklahoma Panhandle and in southwestern Kansas. In these two fields proven reserves of more than 30 trillion cubic feet are recognized. In North and Central Texas, scattered over a wide area and in many places associated with oil production, proven recoverable reserves of from 2 to 3 trillion cubic feet are assured. In the Permian basin of West Texas and of southeastern New Mexico great proven reserves exist, probably of the order of 4 to 5 trillion cubic feet. The market demand for gas from this area has been so limited that careful over-all studies of the region have not been made so far as I know. Nevertheless, we are aware of the great extent of natural gas, much of it in producing formations that have been cased off in wells reaching deeper for oil.

Sabine Uplift Reserves

In the region of the Sabine uplift, which includes northwestern Louisiana, southwestern Arkansas and adjoining portions of East Texas, many great oil and natural-gas fields have been discovered and have been under production for a long time. Some of these fields have been largely depleted, particularly in the upper sands. Many of them are only modestly depleted and a few, such as Logansport, have been but recently discovered. The proven recoverable reserves of this region are of the order of 3 trillion cubic feet. Here the drilling continues active and it is safe to predict that additional substantial reserves will be found in deeper horizons within some of the presently known fields, as also in locations or areas not yet fully tested. The Monroe field of northeastern Louisiana might well be mentioned in connection with the fields of Northwest Louisiana, on account of the manner in which this field is operated in conjunction with other neighboring fields in the supplying of great quantities of gas to many major pipe lines. The Monroe field has a remaining recoverable reserve estimated at approximately 2 trillion cubic feet, having produced in excess of 3 trillion cubic feet.

The Gulf coastal plain is the real storehouse of our natural-gas reserves, both proven and potential. The presently known recoverable gas reserves of the Gulf coastal region west of the Mississippi and north of the Rio Grande are, in my judgment, 25 trillion cubic feet. This estimate does not include several trillion cubic feet of gas dissolved in oil and currently making slight contribution to the used-gas supply of the region. The potentialities in this region are great. Many new fields have been found in every recent year and in spite of the fact that new oil reserves are becoming increasingly difficult to discover there

is no indication that we will have any early difficulty in adding to our known gas reserves whenever it may be worth while to do so. It is recognized that the deeper formations of the Gulf coastal plain are relatively rich in gas and condensate as compared to petroleum. We may expect the future to bring forth many additional producing areas and that deeper drilling in presently productive areas will, if the economics justify, discover new reserves of the order of at least the quantity now known.

Potentialities High

Summarizing this third district, described as the Mid-Continent-Gulf coastal region, we find it to contain presently proven recoverable reserves totaling approximately 70 trillion cubic feet. The potentialities of the region for additional gas not now actually known may, if you like, be anybody's guess. My guess is that with the passage of time natural gas will become more valuable and we will find it economic to withdraw gas from reservoirs such as Hugoton and Amarillo even when the productive capacity of wells has declined below that which today would be economic. These large reserves now recognized as proven but classed as nonrecoverable may become recoverable. Such reserves are potentially recoverable just as are the known reserves of iron ore which because of their grade cannot be economically mined today, and the reserves of coal in seams of, let us say, less than 30-in. thickness which are not today mineable because thicker seams are available. If gas reserves of this category can be included as potential, then I would guess the ultimate reserves of the Mid-Continent-Gulf coastal region to be of an order approaching the presently proven recoverable reserves.

There are doubtless many who will consider my estimate of reserves for the Mid-Continent-Gulf coastal region to be on the high side. To them I will say that the marketed production from this region, 1906 to 1940 inclusive, is given by the Bureau of Mines at 22,902 billion cubic feet. There was marketed production prior to 1906 and there have been enormous amounts of gas wasted in such fields as Amarillo, Oklahoma City, Rodessa and many others. With wastage now under substantial control and with greater control expected for the future it seems to me reasonable to expect a future marketable production of the order that I have suggested.

Rocky Mountain States

Natural gas is produced in several Rocky Mountain states, particularly in Montana and Wyoming. The known gas supply in these states is not great when compared to the Mid-Continent but the supply is very substantial when measured in terms of market requirements. In Montana the Cut Bank, Baker-Glendive, Bowdoin, Kevin-Sunburst, Whitlash, Dry Creek, Bowes and Box Elder fields have known recoverable reserves approximating, in my judgment, at least 750 billion cubic feet. In Wyoming, Colorado and Utah known reserves of a somewhat similar order exist in a number of fields. Substantial additional reserves should be eventually discovered in this broad region by further development of known structures and discoveries in possible areas not yet explored.

California

California is first in the number of natural-gas consumers among all states and is the only large producer of natural gas that does not export or import any of this natural product. Natural-gas production in California in the past has been intimately associated with crude-oil production. Dry gas started to assume importance with the utilization of the Rio Vista field gas in 1941. The fields of the Los Angeles Basin, as also such fields as Ventura Avenue, Kettleman Hills and Kern County, are extremely prolific from areas limited in areal extent but having producing sands of great thickness and fortunately superimposed one above another to very great depths. The production is mainly in the hands of the oil companies and gas production is so handled as to yield the ultimate greatest possible recovery of oil consistent with supplying the necessary natural-gas markets. Inasmuch as the gas is principally carried in the upper portion of the oil-producing sands and in the form of gas caps, production is obtained along with oil. Variation in the gas production is obtained by substituting high gas-oil ratio wells for low gas-oil ratio wells or by drawing gas from wells making no oil.

Total recoverable gas reserves are believed to be of the order of 9 to 10 trillion cubic feet. In recent years most of this gas has been utilized, about two-thirds by the gas companies and most of the remainder by the oil companies. I would, therefore, place the proven reserve available to the gas companies at around 6 to 7 trillion cubic feet, although this may be substantially affected by changing conditions due to the war, such as increased oil production, war emergency regulations, etc. An extensive repressuring program is being inaugurated which may keep the balance close to the present relationship. Additional prospective reserves should be found with deeper drilling in present fields, as also in any field to be discovered in the future.

I have been able to include with this paper a graphic presentation of the natural-gas production and its utilization in California, as also the related crude-oil production. This information was supplied to me through the courtesy of R. M. Bauer, gas-supply supervisor of the Southern California Gas Co. of Los Angeles.

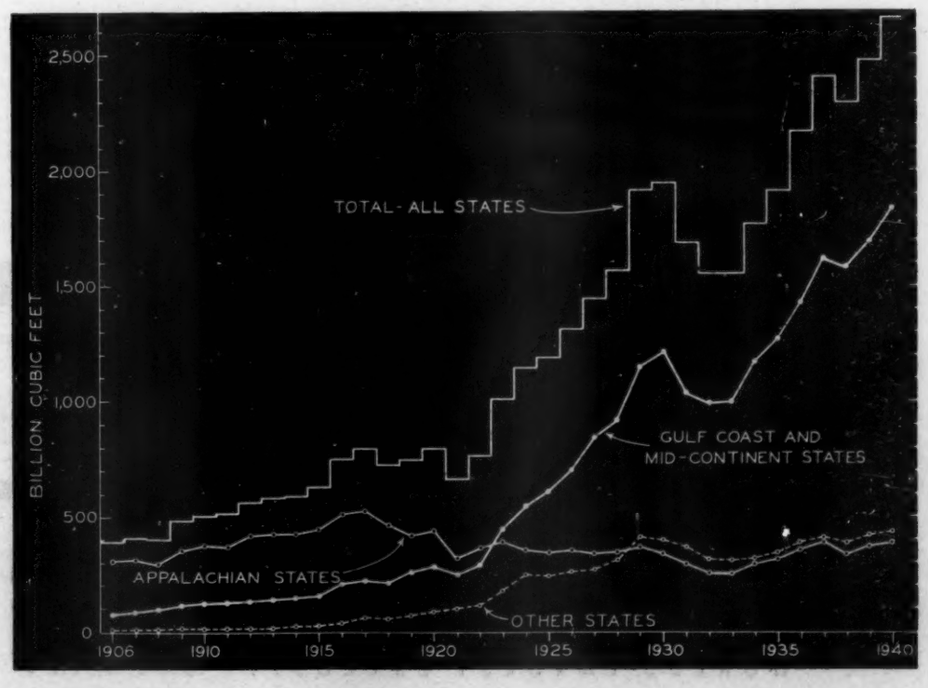
Summary of Gas Reserves

If the preceding statements and analyses of the natural-gas reserve situation in the various districts of the United States be at this time a fairly correct picture we may note that the total proven reserve is of the order of 85 trillion cubic feet and that potential reserves, difficult at best to visualize quantitatively, may be of a similar quantitative order. Unfortunate for our economy as now developed the proven and potential reserves are relatively small in certain regions where the demand for gas is great and exceedingly important. It is to be expected that this situation will within reasonable time and as the conditions permit be overcome in part at least by the installation of new transmission facilities so that gas may be taken from areas of superabundance to areas strong in demand but short on supply. This development should, it seems to me, be for the greatest good of the greatest number, for not only will districts now short or approaching a shortage of gas have the supply replenished at reasonable cost but the regions such as the Gulf coastal plain of Louisiana and Texas endowed with enormous reserves will find it possible to market a substantial portion of the gas output which, in part, to a very recent date and even to some extent right now, sees too much gas going into the air as waste. It is not my intention to discuss conservation as that subject will be covered by other speakers but before leaving the gas-reserve study it may be pointed out that the duration of our supply of natural gas is dependent upon several factors such as known reserves, potential reserves, rate of withdrawal for useful purposes, and wastage.

An accompanying chart shows that natural gas marketed in the United States has increased more than threefold in the past 20 years. Unless everything goes haywire, this trend in the increased use of gas should continue. The importance of gas conservation is now so evident everyone can see it.

In giving further thought to the matter of the longevity of supply we should note that gas lost and wasted amounting to 656 billion cubic feet in 1940 is produced mainly from oil wells and that in my estimate of recoverable reserves I have not included a great deal of the gas contributing to this stream of waste gas. Although the total withdrawal of gas from the ground in 1940 over and above that which was returned amounted to 3,316 billion cubic feet, I believe that the withdrawal from the fields in which I have in-

(Continued on Page 83)



Natural gas produced in the United States and delivered to consumers. (Based on U. S. Bureau of Mines figures)

How a little pump is doing its part!

There are many ways oil producers can save steel. And one of the most practical is by adopting a long range material conservation program.*

When this country's 200,000 stripper wells went on the beam several years ago, small bore metal-to-metal precision pumps were not available. Consequently, to compensate for progressive loss of operating efficiency, pumps of extra size and weight were specified. Now that production has materially declined, the continued use of these old oversize and overweight pumps is putting an unwarranted strain on old, worn pumping units and surface equipment, which will necessitate their replacement much sooner than would be the case if small, efficient pumps were used. And this surface equipment involves a far greater quantity of steel than the pumps themselves.

Help your country and actually save money by junking old, complicated, inefficient pumps and running "Petrol A" Pumps in low production wells for peak pumping efficiency.

Simplification of the design and reduction in the number of parts of "Petrol A" Pumps reduces the weight 75% in comparison with other pumps for stripper wells. This means that the steel in an old, heavy, complicated pump is sufficient to make four new "Petrol A" Pumps, or to make one new "Petrol A" and provide three times its weight for defense.

"Petrol A" rod type pumps can be anchored to old liner barrels without pulling tubing and can be made to run in 1½" insert tubing. Made in top and bottom lock types. See our nearest distributor or send for field representative. Save first and last cost—save steel for defense.

1. **Save steel by keeping surface equipment running longer!** Small bore precision metal-to-metal pumps reduce the load.
2. **Buy the pump with the least steel in it!** Steel saved here builds tanks, guns, ships and planes.
3. **Reduce power consumption with the right sized pump!** Power is as vital to the war effort as material.

FLUID PACKED PUMP CO.

MAIN PLANT: LOS NIETOS, CALIF.

HUNT BUILDING, TULSA, OKLAHOMA; 6006 NAVIGATION BOULEVARD, HOUSTON, TEXAS; TEXAS BANK BUILDING, DALLAS, TEXAS; NATIONAL SUPPLY COMPANY STORES, ILLINOIS FIELDS

* Flopaco "Improved Inserts," "Volume Producers" and "Producers" contain much less steel than other pumps of equivalent capacity. In fields where metal-to-metal pumps are not necessary, "Flo-Ring" and "Flo-Cup" pumps with combination plungers offer another way for the extensive conservation of steel.

WORLD'S LARGEST EXCLUSIVE OIL WELL PUMP MANUFACTURER

Symposium on Illinois Oil Features Technical Sessions

(Continued from Page 25)

tion average was reached 15 months after discovery. Thereafter, fields producing from lime pays declined rapidly and the sand pools less rapidly. From less than 10,000,000 in 1937, the output from these fields jumped to 150,000,000 in 1940 when the peak daily average of 518,000 bbl. was reached.

Fields in the basin are generally characterized by undersaturation of oil with gas and very few are known to have an effective water drive. Rates of production are such that any water drive has had very little opportunity to be effective and the gas has been depleted so the flowing life of the wells is short. Gas-oil ratios average three times as much as the average gas content of the oil in the reservoir and consequently the dissolved gas in the crude will be greatly decreased during the latter life of the pools, the viscosity of the oil will be lowered and the ultimate recovery decreased.

Natural gas produced with the oil was largely wasted. Only a few fields were connected to gas lines and only one or two fields returned gas to the reservoir. Not fewer than 200,000,000,000 cu. ft. were wasted during the years 1938-40. This is about equal to the gas consumed in the state during the same period. Charts of the state's production, reserve and production history show that only about 36 per cent of the reserves discovered since 1936 remain in the reservoirs.

The development in Illinois affords an example of what happens when no legislation exists whereby production can be controlled to prevent waste of oil and gas. The individual corporate operator is generally helpless, under these conditions, to control the course of events however desirous he may be of handling his properties in accordance with the principles of conservation. The fault lies in the failure to put on the statute books, laws which will effectively prevent such waste and which will make possible cooperative development and orderly production.

History of Development

In his paper, Mr. Bell also divided the history of oil production in Illinois into periods similar to those given by Mr. Heroy. According to Mr. Bell it is necessary to go back to 1928 to get a clear picture on the reason for the revival of interest in Illinois as a possible oil-producing area. In that year, the discovery of the Mount Pleasant field in Michigan, in the center of a regional geosyncline, caused a reversal in the geologic thinking and indicated a revaluation of Illinois as a possible oil-producing area was in order.

In 1935, the Pure Oil Co., discoverers of the Mount Pleasant field, and followers of the work of the Illinois Geological Survey, placed a reflection seismograph in service in Jasper, Richland, Clay and Wayne counties. Carter Oil Co. began its surface geology work in 1934. Both companies began their leasing in 1935. Publication of RI-40 by the Illinois Survey in March 1936 caused numerous companies to become interested in the area along with Pure and Carter who had been joined by Shell Oil Co. and Texas Co. in seeking Illinois prospects and leases.

Impetus was added to the lease play when Adams Oil & Gas Co. discovered the Patoka field, the discovery well being located on a known coal structure checked with seismograph. Discovery of Weller and Aux Vases and McClosky production by Pure Oil Co. in the central part of the basin speeded up development. This changed the leasing picture as it was no longer possible to complete detailed geological work before leasing. Consequently, some companies leased large areas and did the detailed structural or seismograph investigations later. Numerous fields were discovered by a combination of geological and geophysical methods. The Louden and Patoka fields are an example of this.

The following table compares some of the facts of the development since 1937 and the development of the old fields in the years following 1905:

	Old fields	New fields
Drilling method	Cable tool	Rotary
Approx. aver. depth, ft.	1,000	2,500
No. producing wells at end of 5 years (1909 and 1941)	11,152	10,496
Aver. prod. per well per day in peak year	9.7	49.6
Total area productive of oil (end of 1941), acres	98,600	97,483
Total prod. to 9-1-42, bbl.	450,660,000	460,226,000
Aver. daily prod. Aug. 1942, bbl.	12,300	252,000
No. of prod. wells	12,800	11,196
Aver. per well per day, Aug. 1942, bbl.	0.9	22.5

Mr. Hake, Gulf geologist, pointed out that Illinois and the region called the Central Interior basin was a weak place in the earth's crust. The sinking in Illinois was in slow increments and this accounts to a great extent for the small thickness of the individual formations and for the comparative thickness of the sedimentary section. At times the sinking ceased and was reversed, and unconformities resulted through erosion of the emerged land surface.

Sedimentation Affected

These movements affected the sedimentation and determined the distribution of the porous and nonporous, and the permeable and nonpermeable rocks and also the different distortions in the earth's crust which became points of accumulation of oil.

Mr. Hake then reviewed the geologic column of the area and pointed out the characteristics, thickness and geologic history of various ages. Ordovician rocks account for less than 1 per cent of the basin's total output and the wells are generally small producers; Devonian rocks account for about 5 per cent of the basin's current production but the wells have in some cases been prolific (as high as 12,000 bbl. daily initial). The Devonian production is often associated with large volumes of water during the later life of the well. Mississippian limestones account for 15 per cent of the basin's oil production with the wells running as high as 9,000 bbl. initial although the flush declines quite rapidly and does not have any appreciable amount of water. The Mississippian (Chester) sands account for about 55 per cent of the basin's oil production and the initial production is often above 1,000 bbl. Pennsylvanian formations were responsible for about half of Illinois' production of oil to 1936 but less than 1 per cent of the production of the new fields comes from formations of that age.

According to Mr. Hake, there are three factors convenient in the evaluation of an area when attempting to predict the type of field which will be found there. The first of these is the comparative rate of marine sedimentation, the second is the uniformity of the strata and the third is the nature of the structural deformities. Illinois falls in the intermediate range in all of these groups.

Mr. Voskuil reviewed the refining and supply situation as it affected and was affected by Eastern Interior basin fields for the past 6 years. He also pointed out that transportation costs are chief reasons for the differential in price between Mid-Continent and Illinois crude.

DEATHS

CLARENCE THOMPSON GIBBONS ULLERY, 66, Tulsa oil man, died Sunday at his home. He lived in Tulsa for a number of years and had developed several oil and gas fields in Oklahoma, Texas and Louisiana. A native of Arkansas, Mr. Ullery moved with his parents to New Mexico, but later came to Oklahoma to enter the oil business.

CLARENCE SCHARBAUER, oil man and rancher, died last week at his apartment in Midland, Tex., after an illness that began in August. Mr. Scharbauer went to West Texas from his native state of New York when he was a youth. He attended Baylor University. His widow and a son survive.

JAMES GRANT HOFF, 79, oil man and resident of Tulsa since 1915, died at his home last week following a lingering illness. He had been retired since he moved from Okmulgee, Okla., but his health did not break until 6 months ago. He was born in Iowa, and before coming to Oklahoma, had lived in Colorado. His widow and two daughters survive.

EDGAR ALLEN KEELER, 44, died last week in Seattle, Wash., from a heart ailment. He had worked in South America for Pure Oil Co. for a time, and later he was employed by Sinclair Oil Co. and Phillips Petroleum Co. He resigned from Phillips to go to Seattle as an engineer in the shipyards. His widow and two sons survive.

HARRY A. KABER, 61, oil producer of Bradford, Pa., died last week at a Bradford hospital, following an operation he had undergone a day previous to his death. Mr. Kaber was born in Davis City, Pa., but had lived in Bradford for many years. His widow and a son survive.

HERBERT R. McKINNEY, 89, retired oil producer, died at his home in Detroit, Mich., following a long period of ill health. Mr. McKinney was born in Pennsylvania, and soon after finishing his schooling started in the oil fields of that state and worked his way up to a producer. He retired 15 years ago. Two sons and two daughters survive.

FRED ISAACS, manager of refineries for General Petroleum Corp., and a member of the board of directors, died September 14. He had completed his twenty-sixth year of service with the company. He was first employed as a draftsman in the refinery department, and 2 years later was made foreman of the Vernon refinery. He became superintendent of the refinery in 1924, and when the Torrance refinery was constructed in 1929 he became manager of refineries. In January 1941, he was made a member of the board.

GEORGE McKEOWN, 57, plant superintendent for Imperial Oils, Ltd., Toronto, Ont., for the past 5 years, died at Calgary, Alta.

JOSEPH McELROY BELL, of Robinson, Ill., vice president of Bell Brothers, oil producers, died September 14 following an illness of 3 weeks. Death was attributed to a heart ailment. Mr. Bell was born in Kansas, and at one time was a resident of Oil City, Pa., where he was interred. He was a veteran of the Spanish-American War, in which he took part in the Puerto Rico campaign and the battle of Coamo. Survivors include his widow, two sisters and a brother.

LEO A. WHITE, 60, manager of the central division of Oklahoma Gas and Electric Co., Sapulpa, Okla., died Saturday in a Tulsa hospital, following an operation. Mr. White had lived in Oklahoma for 32 years. His widow and two daughters survive.

Natural Gas News

Maximum Preparation for War Requirements Urged at Annual Meeting of Gas Association

CHICAGO.—Maximum preparation for serving the heavy war requirements on the natural-gas industry with minimum expenditure of critical materials were urged here this week by speakers at the annual meeting of the American Gas Association October 5 and 6.

A symposium on the war requirements in the five OPC districts featured sessions of the natural-gas division. General papers were presented by J. French Robinson, chairman of the natural-gas section, director of District 2 and president of the East Ohio Gas Co.; George S. Hawley, president of the general association and of the Bridgeport Gas Light Co.; Alexander Forward, managing director of A.G.A.; Martin T. Bennett, chief gas-supply section, power branch, War Production Board and by E. Holley Poe, former secretary of the A.G.A. natural-gas section and now director of the natural-gasoline and natural-gas division of the Office of Petroleum Coordinator.

Arthur F. Bridge, vice president and general manager, Southern Counties Gas Co., Los Angeles, Calif., was formally inducted as president of the A.G.A. Officers of the natural-gas section are Burt R. Bay, Northern Natural Gas Co., Omaha, Neb., chairman, and R. E. Wertz, Amarillo Gas Co., Amarillo, Tex., vice chairman.

Most OPC district chairmen reported that facilities and supplies of natural gas were sufficient to meet anticipated requirements. An exception was the eastern district where new transmission facilities from the fields in the Southwest are needed to maintain present efficiency. Chairmen of the districts reporting on regional conditions were: Mr. Robinson for District 1; Mr. Bay for District 2; N. C. McGowen, president of United Gas Pipe Line Co., District 3; R. W. Hendee, general manager, Colorado Interstate Gas Co., for District 4, and William Moeller, Jr., vice president, Southern California Gas Co., for District 5.

Curtailment of off-peak interruptible gas service to certain industrial consumers is indicated by existing conditions, Mr. Bay suggested in his review of conditions in District 2.

"This service to industry," he said, "is complicated by the critical oil situation in the Atlantic seaboard states. With the heavy burden of serving new war industries and the increased demands of other industries imposed upon the gas pipe-line systems, coupled with our inability to expand capacity because of shortage of critical materials, some increased curtailment of this type of gas sale appears to be a certainty."

A possible reduction in consumption of natural gas for the production of carbon black was pointed out by Mr. Bay. It has been found that the so-called "soft" or "furnace black" is superior in some respects to channel black in the compounding of synthetic rubber and the manufacture of tires. Processes now yield about 6 to 8 lb. of soft black from 1,000 cu. ft. of gas in contrast to 1.4 lb. of channel black, Mr. Bay said in explaining the prospect that natural-gas requirements for this purpose may be reduced and thus make additional quantities available for industrial and domestic consumption.

Research activities of the Institute of Gas Technology, affiliated in the A.G.A. group, has been concerned with the preparation of butadiene for synthetic-rubber manufacture, F. W. Sullivan, Jr., technical director, reported at a session devoted to postwar outlooks. Investigations on adsorption, Mr. Sullivan continued, are at present concerned with the production of active carbon which has broad military significance because of its use in gas masks.

"Indications are," Mr. Poe declared, "that we have ample gas reserve, with few exceptions strategically located to meet demands. Conservation of natural-gas reserves and conservation in the production, transmission and utilization must be faced positively by all of us."

The industry was warned by Mr. Poe that it must continue to render maximum service without relying on critical materials. He explained that M-68 is a flexible regulatory measure on drilling and the use of equipment. Exceptions, he said, have been and will continue to be granted wherever conditions show modification is essential to furthering the war program.

Dry and Wet Gas Price Ceilings Placed Under Petroleum Regulation 88 By OPA

WASHINGTON, D. C.—Ceiling prices for natural gas, both wet and dry, last week were placed under Revised Price Schedule 88 (petroleum and petroleum products) by the Office of Price Administration.

Rates specifically excluded from control under the Emergency Price Control Act, such as those charged by public utilities, however, are not affected by this action.

Both wet and dry gas previously had come under the General Maximum Price Regulation. The change will bring a more equitable realization on prices for sellers of wet gas from which natural gasoline and other products are extracted but will not increase prices of natural gasoline to the consumer.

Prices for wet (casinghead) gas during March 1942, the base period used in the General Maximum Price Regulation, were lower than prices during October 1941, the base period used in Revised Price Schedule 88, for natural gasoline. By placing wet gas under the petroleum schedule, prices for that product are put in direct relationship with the prices of natural gasoline.

Dry gas, or ordinary natural gas, was placed under the schedule in line with the policy of unifying control of all prices of petroleum products under one regulation.

The change is contained in Amendment 32 to Revised Price Schedule 88. It is effective October 7, except that a buyer and a seller of wet gas may agree to make the effective date retroactive to May 11, 1942.

The amendment provides that the price for wet gas produced from any given field shall be the highest price that could be arrived at under the terms and conditions of any contract between the seller and buyer in effect May 1, 1942, for the sale of wet gas produced from that field.

May 1 was selected because use of that as a base period will not result in higher maximum prices for the gas than would result from use of October 1, 1941, and will not entail any increase in the price of natural gasoline.

If a seller had no contract in effect on May 1 for wet gas produced from any given field his maximum price will be the highest price that could be charged at that time under the terms and conditions of any contract in effect May 1 between the seller and a purchaser of the same class for the sale of wet gas produced from that field.

Where a price cannot be arrived at under these methods or where the buyer wishes to extract some produce from the wet gas not contemplated in the contract (such as some new product), a tentative price may be set. The buyer must request approval in writing from the OPA office in Washington for such a tentative price within 15 days after it is established and must include in his request certain information specified in the amendment.

Where a contract for sale of dry gas was in effect October 1, 1941, the seller's price to the buyer under the contract shall not exceed the highest price that could be charged at that time under the contract.

Where no contract was in effect October 1, 1941, between the seller and a particular buyer, the seller's maximum price shall not exceed the highest price that the seller could charge a purchaser of the same class.

If the seller did not deal in dry gas on October 1, 1941, his maximum price shall not exceed the maximum price established at that time by the seller's most closely competitive seller of the same class to a purchaser of the same class.

Where a maximum price cannot be arrived at by any of these methods a tentative maximum price may be established as for wet gas.

Recycling News

More Efficient Recycling Plan Proposed in Texas

AUSTIN, Tex.—Stanolind Oil & Gas Co. last week proposed a revision in its La Rosa field recycling operations to increase the efficiency of the project under the existing shortages of materials. The plan proposed by Stanolind, individualistic in the sense that it is suggested for only one operation, may become a pattern for approximately similar conditions in other districts. The case was reviewed before the Railroad Commission.

The company has been recycling the 5,600 and 5,800-ft. sands. A third gas-distillate pay has been developed at approximately 5,300 ft. and the operator desires to include the new zone in the program. The War Production Board has rejected applications for materials with which to drill additional wells to the new pay. Stanolind, as an alternative, is seeking Railroad Commission authority to temporarily shut off the lower oil-producing sands in five wells, recomplete them as gas wells in the upper pays and transfer the oil allowables of such wells to others on the same lease producing from the same sand. When the gas-distillate zones have been depleted, probably 4 years hence, the plugged-off oil sands will be reopened and produced.

ENGINEERING *and Operating* SECTION

▼

Construction Practices on 24-in. War Emergency Pipe Line

By PAUL REED

BEFORE plans were definitely made for laying the 550-mile, 24-in. crude-oil line of War Emergency Pipelines, Inc., from Texas to Illinois, there was much speculation regarding the methods which would be employed in construction of this project.

It was asserted that 24-in. pipe could not be cold-bent without buckling, and it was widely believed that the most practicable method would be to use factory bends. But factory bends were not procurable. Once work was under way, experience in the field demonstrated that the pipe specified for the job was readily cold-bent and was generally well suited to customary construction procedures. These, as well as other points, have been settled to a large extent by practical experience in the construction of the project.

The purpose of this article is to go somewhat further into a discussion of construction methods than was possible in a review of the project included in "New Oil-Transportation Era Presaged by Pipe-Line Work" appearing on Page 52 of the Annual Pipe-Line Number, September 24, 1942.

Certain practices are being modified as the result of initiative applied to this unusual undertaking. Methods described can be observed by anyone coming in contact with the work at the numerous points where it is being carried on along a route which traverses four states.

Construction records are being broken by contractors laying the line under the direction of B. E. Hull, vice president and general manager, and A. N. Horne, vice president and general superintendent. With good weather at the present rate of progress the line will be more than half completed by the end of this week.

Pipe furnished for the project is Grade B, seamless, plain-end pipe, in random-length joints, approximately 40 ft. long. It consists of pipe of the following types: 550 miles of 24-in. o.d., 94.62-lb. pipe with ⅜-in. wall thickness for the main trunk line from Longview, Tex., to Norris City, Ill.; 5½ miles of 10¾-in. o.d., 28-lb. pipe for the Norris City-Enfield, Ill., spur, and 24 miles of 14-in. o.d., 46-lb. pipe for the Norris City, Ill.-Mount Vernon, Ind., branch.

In welding by the shielded-arc process, contractors have an option of choosing one of two procedures. These are indicated by the following

Below: Dusting off primer coat ahead of coating and wrapping operations. Right: Oklahoma Contracting Co. used ditcher with 28-in. buckets preceding one with 36-in. buckets to speed up ditching

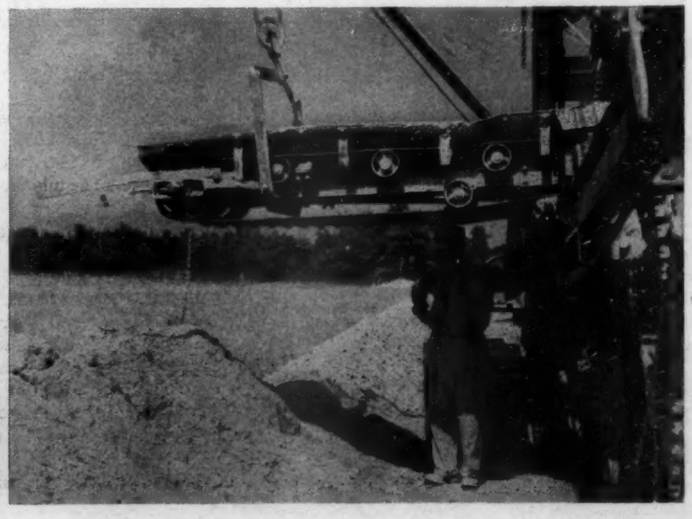


table showing the number of beads and rod sizes required for both roll welds and position welds for 400-amp. and 300-amp. machines:

OPTIONAL WELDING METHODS

Amperes	No. of beads: Roll weld	No. of beads: Position weld	Size of rods: Roll weld	Size of rods: Position weld
400	3	3 or more	7/32-in.—1st bead 1/4-in.—2nd bead 5/32-in.—3rd bead	7/32 all beads
300	4	4	7/32-in.—1st bead 1/4-in.—2nd bead 7/32-in.—3rd bead 7/32-in.—4th bead	7/32 all beads

Welders for making tack welds and first beads are selected after demonstration of ability to penetrate pipe metal and to build up a small amount of reinforcement at the root of the weld. No welds are acceptable unless they approach 100 per cent penetration. Welds must be free of porosity, gas pockets, slag pockets, and other nonmetallic inclusions, pin holes, rivers, and other defects. Welds are rejected which show, in a nick-break test, a porosity exceeding six gas pockets per square inch of surface exposed in the fracture and if any gas pocket exceeds 1/16 in. in any dimension. A minimum of reinforcement of 1/16 in. above the outside pipe surface is required and this reinforcement must be free of any concave tendency.

For testing, welds are cut from the line according to directions of inspectors of War Emergency Pipelines, Inc.

Twelve coupons may be cut from each test weld, four of which are tested for tensile strength, four for ductility by the bend test, and four for porosity and penetration by the nick-break test.

In accordance with standard practice, a portable machine tests for tensile strength. If, out of four coupons, more than one breaks in the weld or the juncture of the weld and the parent metal, the welder is disqualified. If only one of the four coupons breaks in the weld and such a weld fails to develop the minimum tensile strength of the pipe metal, the welder will be disqualified. The reinforcement of the weld is left in place during the tests. Bend tests and nick-break tests are made according to standard methods.

Lining Up Pipe

Pipe ends are spaced not more than 1/8 in. for welding and inspectors are expected to refuse to pass welds not properly built up and in which spacing of the pipe has been excessive. Because wall thickness of 24-in. pipe for this project is greater than it is for pipe of the same diameter which the industry has been laying for natural-gas lines, more time must be taken in lining-up, preparatory to tack welding, than is ordinarily required. Considerable pounding of the pipe is frequently necessary to correct a high-low condition at ends of the joints. Some of the welding clamps employed by contractors were developed for use on the 400 miles of 26-in. loops laid last year for Natural Gas Pipeline Co. of America. In fact, that project, to some extent, served as a proving ground for a number of improvements in the construction of modern big-inch lines.

Since the prevailing method for laying large-diameter lines has been roll welding, it was anticipated, prior to construction, that the 24-in. crude line would be largely laid by this procedure. Now that half the spreads have swung over to laying by stovepiping, certain features of this method receive special attention. It becomes more important that tack welds be made so as to withstand the strain in lining up when the next joint is added to the line.

Several changes have been observed in stovepiping. The most conspicuous has been a method for supporting pipe directly over the ditch, adopted by the Oklahoma Contracting Co. This consists of using a crib of skids, criss-crossed in several layers, which is placed under the end of each joint at the time it is tack welded to the part of the line already over the ditch. It is said that supporting pipe at this unusual height has advantages in making work easier for bell-hole welders and for boom tractors which must lift the pipe in later operations.

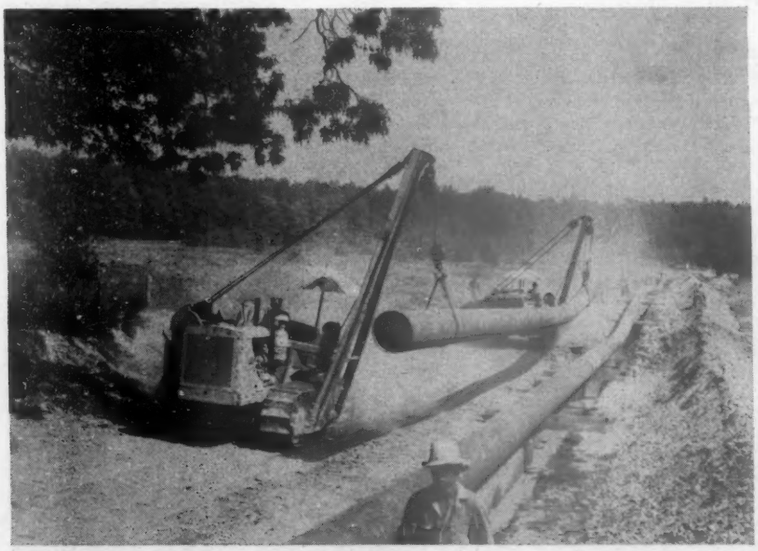
Bending of three or four-joint sections of pipe, to conform with ordinary differences in elevation, is generally done with surprising speed by cold bending methods, either over the ditch or in an open space where three tractors can operate more effectively. Owing to the character of the steel, there have been few cases of pipe damaged by buckling during bending.

Fire bending of single joints is done by standard procedure commonly used by which one end of the pipe is held by special equipment while the other end is pulled by a cable operated by a tractor when the joint is heated by burning kerosene in an enclosed space. Sag bends and side bends fit the ditch while overbends are 8 to 12 in. above the trench bottom.

Ditching is done in the following manner:

DITCH SIZES

Size of pipe (in.)	In earth or when no blasting is required: Width (in.)	In earth or when no blasting is required: Depth (in.)	In rock when blasting is necessary: Width (in.)	In rock when blasting is necessary: Depth (in.)
10	22	34	22	22
14	26	38	26	28
24	36	48	36	36



Top: Tractors taking bent section to point where it will be added to line. Lower left: Fire bend being made by Williams Brothers Corp. gang at river crossing. Below: Machine for both coating and wrapping

While one contractor was waiting for the arrival of 36-in. buckets for equipping a second ditcher, he found that he could make about 2,000 ft. more of ditch per day by having a ditcher equipped with 28-in. buckets precede that with 36-in. buckets which was digging for the 24-in. line.

Individual joints are swabbed out by one contractor who sends a man through the pipe, lying on a rack, equipped with roller-skate runners. This device was described on Page 98, in the Practical Suggestion Section, of the Annual Pipe-Line Number, September 18, 1941. It was first used by an organization of T. R. Jones in laying a line for the Michigan Gas Transmission Co.

Two types of protective caps to close ends of the pipe are in use. One is of wood, held with steel straps. The other is a steel pipe, tack welded to the end of a section of the completed line.

Protection of most of the line is accomplished by the mechanical application of a cold primer coat of paint, followed by a hot coat of mineral-filled asphalt coal-tar enamel which is immediately wrapped spirally with an impregnated asbestos felt overlapping 1-in. Special mechanical equipment has been developed for applying coating and wrapping.

Pipe is cleaned with a traveling-type machine before primer coat is applied to a surface which is clean and free from moisture. Coating is applied with a thickness of 3/32 in. Voids located by holiday detector are covered by brush applications. Bags filled with cottonseed hulls have proved to be preferable to bags of sawdust for supporting coated pipe on the skids.

At river crossings and road crossings, provision has been made for additional protection. Coating at river crossings is protected by a covering of wooden slats. All of the work at river crossings is being handled by Williams Brothers Corp. which is also doing the construction work on the Texas section of the main trunk line. At river crossings and at other points requiring special attention, provisions for protection are made which are appropriate for existing conditions.

Slack is distributed uniformly in the bottom of the ditch in a manner which does not injure protective coating. A procedure for obtaining the desired amount of slack consists of laying the line alternately over and off the ditch at intervals ordered by inspectors. When lowering into the ditch from the rear to the front, the contractor leaves a skid under the pipe at frequent and regular intervals; he finally removes these skids from front to rear. The program for the project calls for lowering slack loops into the ditch before temperature rises above 80°.

Where coated pipe is laid in rocky soil, a cushion of earth is put in the bottom of the ditch before the pipe is lowered and a layer of earth is placed over and around the pipe before the ditch is backfilled in order to avoid damage to the coating by contact with rock.

After the line is completed, it may be tested for leaks by use of compressed air, containing a malodorant, maintained at 100 lb. pressure for 24 hours. When the finished line is filled with oil, a final hydrostatic test may be made at a pressure of 800 lb. for a 24-hour period.

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War Emergency Line Makes Good Progress

WASHINGTON, D. C.—From information available regarding progress made by War Emergency Pipelines, Inc., it appears that by the end of this week 260 miles of pipe on the main line will be completed and laid in the ditch. At the beginning of the week, more than 220 miles had been completed. Nearly 300 miles of pipe had been delivered to the right-of-way. About 240 miles will probably be backfilled by the end of the week.

On October 2 the laying of 8.35 miles of line was completed which breaks a previous record of 8.15 miles September 23.

Prospects are very good for the completion of work for laying line some time in December. It is even possible that some oil may be pumped through the line by January 1, but it is reported to be doubtful whether the pump stations will be completed so as to function at capacity until the end of January.

To make the War Emergency pipe line fully effective it should be continued to the East Coast. Conferences are in progress this week which may lead to authorizing the furnishing of 230,000 tons of steel for the 1,000 miles which remain to be laid between Norris City, Ill., and New York and Philadelphia areas. With construction organizations increasing their efficiency by the assembling of equipment and skilled men, it appears that it would be a mistake to sacrifice this asset by stopping work when the line has been completed as far as Norris City. If these organizations are scattered, 3 or 4 months time might be lost in regaining efficiency which is now available. If the project continues steadily without a stop, it seems reasonable that it may be completed all the way to the East Coast by June 1, 1943.

Work through the winter will be somewhat slower but much can be done in the clearing of right-of-way to facilitate construction.

Below: Power-driven boring machine for road-crossing loaned by O. E. Dempsey Construction Co. to Anderson Brothers. Top: Tractor holding bending shoe is braced by second tractor while third tractor pulls end of section of pipe being bent. Lower right: Completion of bend by three tractors

GLOSSARY of terms used in PETROLEUM CHEMISTRY

Cetane and Cetene

These terms represent, respectively, paraffinic and olefinic hydrocarbons, and have been made from natural cetyl alcohol. While both were formerly used as minimum-knocking constituents of standard diesel fuels, along with high-knocking methylnaphthalene, the more stable cetane is now preferred. The knocking characteristics are the reverse of gasoline constituents.

Free Energy

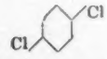
The free energy of a process is the maximum amount of work available in going from an initial state to a final state. The free energy change of a chemical reaction is the free energy of formation (from their elements) of the products of a reaction, less the free energy of formation of the reacting substances. A reaction having a large negative value for the free energy change is a reaction which is capable of taking place and continuing to practical completion. It does not follow that the reaction will occur rapidly.

Numbers

Names commonly serve to distinguish isomeric compounds. Thus orthodichlorobenzene

is also 1,2-dichlorobenzene.

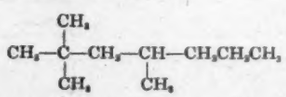
Whereas,



is called either para- or 1,4-dichlorobenzene. In aliphatic usage, the name 2,2,4-trimethylheptane may serve as an example. *n*-Heptane has the structure

$$\overset{1}{CH_3}\overset{2}{CH_2}\overset{3}{CH_2}\overset{4}{CH_2}\overset{5}{CH_2}\overset{6}{CH_2}\overset{7}{CH_3}$$

This compound is considered the parent of the more complex hydrocarbon, having three methyl ($-CH_3$) groups substituted for three hydrogen on the second and fourth carbons of *n*-heptane, as shown in the structure



The position of the three substituent methyl groups is designated by the numbers of the carbons to which they are linked; that is, "2,2,4-trimethylheptane."

Resin

A rather loosely used term used to mean any one of a large group of both natural and synthetic products. The word is used quite interchangeably with the word plastic. Resins are amorphous, often brittle organic substances of high molecular weight. They are insoluble in water but more or less soluble in organic solvents. A thermoplastic resin is usually soluble and is fusible on heating, where a thermosetting resin becomes highly insoluble and permanently nonfusible as a result of strong heating. Rosin, a byproduct of turpentine manufacture, is a common natural resin; celluloid, bakelite, and lucite are well known synthetics.

Saponification

In its most common use, the term applies to the alkaline hydrolysis of an ester to give an alcohol and the salt of an organic acid. An example is the saponification of a fat or fatty oil to yield an alcohol, glycerol and a salt known and used as "soap."

Synthesis

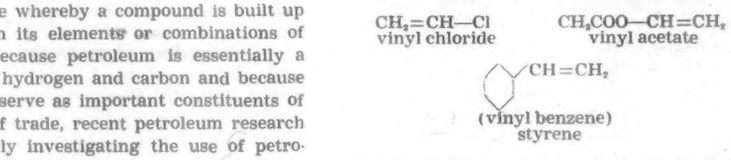
The procedure whereby a compound is built up chemically from its elements or combinations of its elements. Because petroleum is essentially a combination of hydrogen and carbon and because these elements serve as important constituents of many articles of trade, recent petroleum research has been eagerly investigating the use of petroleum to make plastics, explosives, glycerin, etc.

Valence

One of an element's most fundamental properties. Yet several somewhat distinctive ideas are implied by the word. In general, it concerns the relative numbers of unlike atoms which combine with each other. The most simple specific definition of the valence of an element is the *number* of atoms of hydrogen which will combine with, or be displaced by, *one* atom of that element. Thus the valence of sulfur in hydrogen sulfide, H_2S, is two.

Vinyl compounds

Those containing a vinyl group ($-CH=CH_2$) in their molecular structure. Examples are.

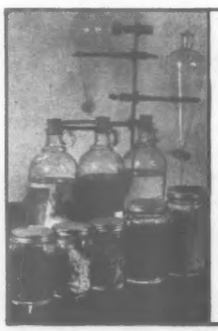


$CH_2=CH-Cl$ vinyl chloride

$CH_3COO-CH=CH_2$ vinyl acetate

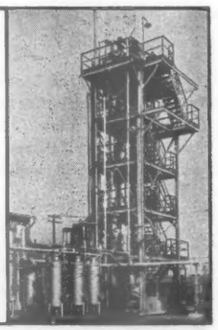
$CH=CH_2$ (vinyl benzene) styrene

Such compounds, being unsaturated, give not only the expected common addition reactions with hydrogen, bromine, etc., but in many cases are especially prone to polymerize to large molecules. Hence they figure prominently in the manufacture of plastics, such as vinylite, styron, etc.



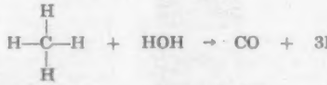
CHEMICALS *from* PETROLEUM

By W. T. ZIEGENHAIN



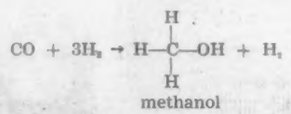
METHANOL

IN recent years, substantial quantities of methyl alcohol or methanol have been recovered from petroleum as a result of the latter's partial oxidation. In the commercial production of this important material, natural gas plays an increasingly important part. The methane, ethane, propane contained in natural gas can be converted to methyl alcohol. The most common of these is methane, of course, and the generally accepted procedure for the chemical synthesis of methanol from methane follows:



methane — steam — carbon monoxide — hydrogen

then,



methanol

This reaction accounts for the presence of hydrogen with the methanol at the end of the reaction. The excess of hydrogen is considered essential for controlling the oxidation.

A similar oxidation procedure can be maintained for the manufacture of ethyl alcohol and other alcohols of higher molecular weight providing the correspondingly higher molecular-weight basic hydrocarbons are chosen for the reaction with steam.

The procedure outlined above has been given most attention in the production of hydrogen, carbon monoxide and carbon dioxide. When a catalyst is used the reaction can be carried on between the hydrocarbon and steam at a rapid rate and at a relatively low temperature. In the absence of a catalyst, the reaction requires a rather high temperature. These temperatures, however, are well within commercial range and the procedure is being carried out on a large scale within at least one large petroleum refinery.

Methanol is well known as an automobile antifreeze material. However, it is not as popular as ethanol or ethyl alcohol for this use. Methanol is a colorless liquid, highly inflammable and poisonous. It has a specific gravity of 0.7913; boils at 152.2° F. (66.78° C.) and weighs 6.59 lb. per gal. at 68° F. (20° C.). The normal method of purification is by repeated fractionation.

California Deep-Drilling Rig Uses Direct Electric Current

By L. D. BANDEROB and P. L. SAVAGE

Electrical Engineer, Belridge Oil Co.

Engineer, General Electric Co.

A new application of motor-generator sets has been successfully made, this time to a rotary drilling rig in California. Power equipment consists of two motor-generator sets which convert alternating current from the lease generating plant to direct current at the rig. The rotary draw-works drive is capable of a maximum output of 800 hp.

Outstanding characteristics of the rig as shown by the drilling of a 9,673-ft. well are: (1) Flexibility equal to any rig; (2) ease and smoothness of control; (3) positive limitation of the torque applied to the machinery; (4) automatic increase of motor speed with the reduction in load; (5) continued sustained performance of equipment over periods of hard usage; (6) extreme portability.

DURING the month of December 1941 the Belridge Oil Co. put into operation a direct-current electric drilling equipment of most modern design. Operating in the North Belridge field, Kern County, California, during the past few months the equipment has given an excellent account of itself, since it provides those qualities most desired by drillers, namely: ample power, flexibility, ease of control, and portability.

Direct-current equipment was selected because it offers the smooth control of power and flexibility, characteristic of a modern steam rig without the attendant difficulties required in moving and setting up boilers and the problem of obtaining fuel and water.

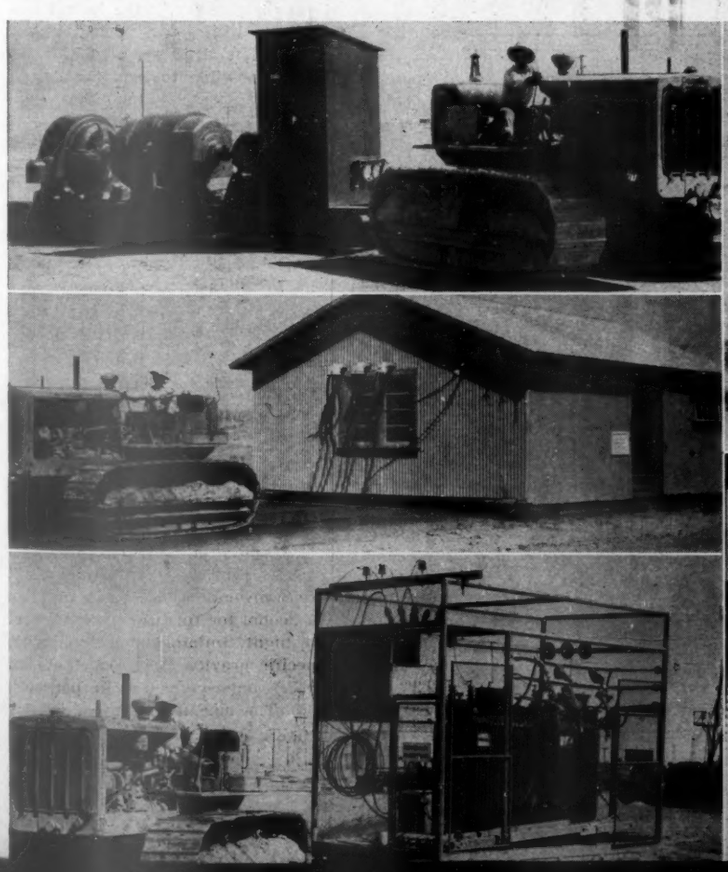
The equipment is unique for several reasons. It is the highest powered electric drive so far built for rotary drilling. It is the only existing direct-current drilling equipment using alternating-current power supply, as the direct-current generators for such a drive are usually driven by internal-combustion engines. The arrangement of the electrical equipment, especially the direct-current power supply and the portable substation, offer the maximum in portability; and once the equipment is in place, electrical connections are a matter of minutes.

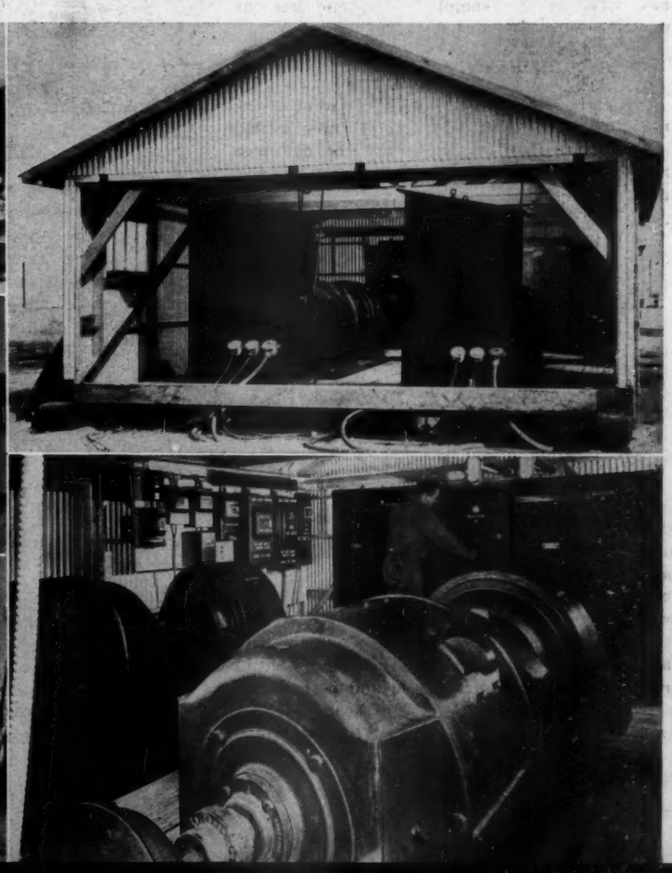
A conventional type draw works is driven by two direct-current drilling motors rated 250 hp. each. These two motors are capable of delivering considerably in excess of 800 hp. for hoisting operations. Since the motors may be required to run at very low speed for long periods of time during the drilling operation, ventilation is supplied to them by a blower, which takes air from a remote point to insure against the presence of explosive gases. Provision is made in the control scheme so that the ventilating fan is started a short time prior to applying power to the motors, in order that all explosive gas will be purged from the ventilating system. The two draw-works motors are connected to a twin gear, which is chain-connected to the draw-works jack shaft.

Direct-current power for the draw-works motors is obtained from two motor-generator sets located approximately 150 ft. from the derrick floor and, therefore, well away from any possible gaseous area. Alternating-current power for driving the two motors on the motor-generator sets is obtained from the power plant owned and operated by the Belridge Oil Co.; this power is delivered to the portable substation from a 11,500-volt transmission line. The portable substation provides the 110-volt lighting service and the 480-volt, three-phase power necessary to operate the alternating-current motors. The use of motor-generator sets is unusual in oil-field history and, as far as we know, this is the first time a direct-current drilling equipment has been satisfactorily operated from central station power.

There are two motor-generator sets, each mounted on a self-supporting skid base. Each set is complete in itself and consists of a 350-hp. induction motor, driving a 200-kw. direct-current generator. Each set also includes a direct-connected exciter rated 15 kw. at 125 volts. Either exciter is capable of providing all excitation required.

Left, upper: Motor-generator set mounted on skid is pulled from location to location by tractor. Middle: Skid-mounted shed which houses motor-generator sets is moved as a unit. Lower: Transformer bank is also mounted on skids and is easily moved. Right, upper: Interior view of shed. The plowed-in cables with their plug couplers can be seen here. Right, lower: Motor-generator sets installed in shed. Control equipment is permanently installed in the building





With the exception of the driller's control, all control equipment is mounted in two cabinets—one of which is mounted on each of the motor-generator bases and remains a fixed part of this unit.

In order to give the driller complete control of the power unit, all control push buttons are brought to the derrick floor by means of a multiple conductor cable. It is, therefore, possible to start and stop the motor-generator sets without the necessity of leaving the derrick floor.

There are two motors on the draw works, each operated by its own generator, and it is possible to use either or both motors depending on the operation and the amount of power required. For instance, when coming out of the hole with a heavy load both generators and both draw-works motors can be used. When rotating drill pipe, only one motor and one generator are required. The idle generator can be utilized for a mud-pump drive.

Use Generator Field Control

Control of the motors is by means of generator field control. This type of control has proven very satisfactory for oil-field service, for complete control of the motors is accomplished without handling heavy current. When both motors are in operation on the draw works, the generator fields are placed in series, thus insuring that each generator will take its share of the load.

The driller's control is simplicity itself and consists of a single hand wheel and two push buttons. The push buttons allow the driller to select either or both motors, depending on the amount of power required.

A half turn of the control wheel in the clockwise direction takes the motors from standstill to full speed forward so smoothly that the individual steps are not noticeable. To reverse the direction of the draw works, it is only necessary to turn the control wheel in the opposite direction.

Among many advantages of the use of direct current for drilling operations is the fact that torque and horsepower can be definitely limited by generator adjustment to suit the mechanical equipment being used. In this case, the horsepower is limited to somewhat over 800 as it is felt that more power applied to the present equipment would increase the strain on gears, draw works and lines to the point where maintenance costs would be excessive.

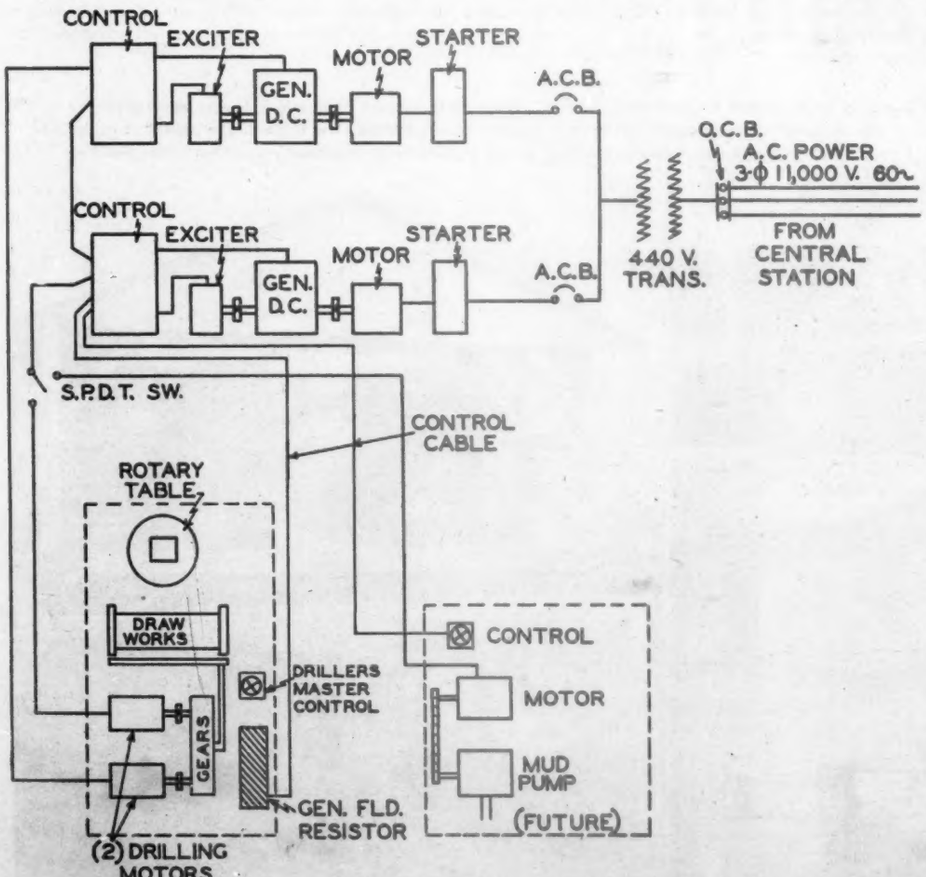
The building housing the motor-generator sets is a simple frame building, with a removable floor, made rigid enough to withstand moving from location to location on its own skids (Switches and starters are left permanently installed.)

The electrical hookup is simple. The large direct-current cables and control cables are laid in a plowed ditch. The control cables are provided with plugs and are connected to the couplers by plugging in. The various leads to the motors are marked and can be connected readily.

When all motor connections are made, the substation is connected to the 11,500-volt line and as far as the electric equipment is concerned, drilling is ready to begin.

The first well drilled with this equipment was carried to a total depth of 9,673 ft. and is producing from a depth of 8,550 ft. The equipment is currently at work on the second well.

View of the general layout of the rig showing the position of the generating and transforming equipment in relation to other items



Schematic drawing showing the general wiring diagram and control supports of the direct-current driven rigs

Characteristics of Rig

This first well, being exploratory, was subjected to considerable testing, involving many and frequent trips in and out of the hole under varying conditions which afforded experience with the drilling motors comparable to drilling several deep wells. This experience provided an excellent opportunity to gage the performance of this new equipment, the following being apparent:

1. The flexibility equals that of the finest steam equipment.

2. The ease of control and smoothness of control exceed that of any other equipment of the writers' experience, either steam, gas engine, or alternating-current electric.

3. The torque limiting feature inherent in this equipment is of great value in hoisting through tight places, through keyways in the hole, when rotating in difficult drilling or when fishing. This feature provides at all times a cushion beyond which it is impossible to load the driven equipment.

4. The motor speed increases automatically as the load becomes lighter to a maximum of 1,270 r.p.m. with an empty hook which is ample. Therefore, each stand of pipe is hoisted at a higher speed than the preceding stand. In effect, this is comparable to a mechanical drive with an infinite number of gear ratios and with each correct gear ratio automatically selected.

5. The performance of the electric equipment does not decline with continued hard use.

All of these advantages together with the fact that there is ample power for deep drilling, result in fast, economical drilling, long life for equipment, and complete driller satisfaction.

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Correction for Smith Article

The article entitled, "Results of Corrosion Inhibitor Demonstrated in Products Line," by S. S. Smith, appeared in the September 24 issue with an incorrect footnote, owing to a typographical error, on Page 85 which reads in part "predominantly sodium nitrate." The last word should have been "nitrite." The Wachter patent, No. 2297666, is licensed by Shell Development Co., San Francisco, Calif.

Refinery IDEAS

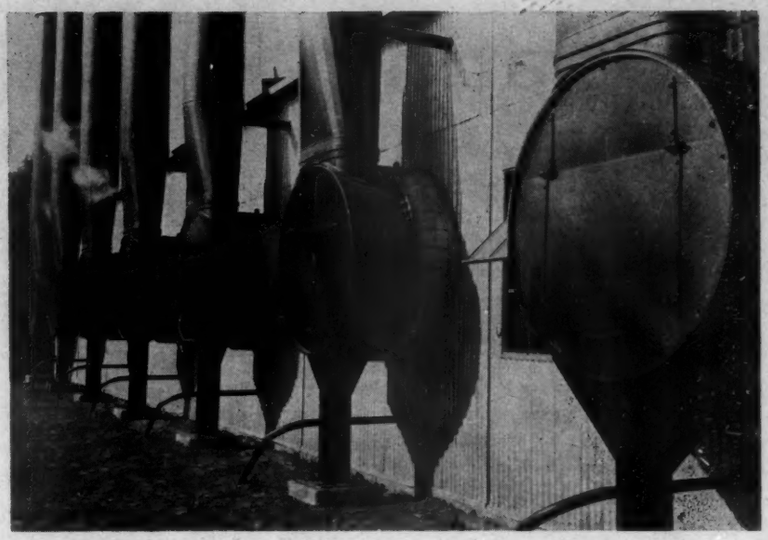
. . . that save $ $ $

Material Concentration Platform

Material concentration platforms as shown are placed at all units. They are truck-bed height, 8 ft. by 10 ft. long, and have a division bar in the center. On one side of the bar a sign reads "MATERIAL RECEIVED" while on the opposite side a sign reads "MATERIAL AND SALVAGE TO BE HAULED AWAY." There is a rack provided on one side for a pair of 8-ft. steel scaffold horses with attached safety hand-rail chains. On a rack beneath the table are placed three 2-in. by 10-in. by 10-ft. scaffold boards, a rung ladder, and a step ladder. Craftsmen are always requested to place the scaffolding and ladders back in the racks after use.

Conserve Rags in Plant by Classifying Condition

Wiping rags, around most refinery and gasoline-plant engine rooms, are getting increasingly scarce. This fact together with the desire on the part of the operators to keep them in a convenient place and still hold the oily rags in a fireproof container has prompted one plant to provide the three closed containers shown in the picture. The designations on the cans are self-explanatory as to their use. Note should be made that the three rest upon an elevated steel platform.



Boiler Extends Through Side of Building

Conserving space and making the replacement and cleaning of boiler tubes easier, one company has allowed the location of its boilers to be greatly altered from the conventional. Here is shown a battery, each boiler of which has a separate stack which extends up from the smoke arch outside the building. This eliminates cutting the roof. A feature of the installation is the manner of supporting the smoke arch by having it rest on the curved saddle supported by the 8-in. pipe set on a concrete base and strengthened by the welded angle plates. A blow-down line extends from the boiler to a disposal line, the line passing through the 8-in. pipe support to give it rigidity and add safety.

Lines Aboveground Conserve Metal, Space and Promote Safety

Numerous features can be recognized in the construction details shown in the accompanying picture. The concrete piers, spaced at about 15-ft. intervals provide substantial support for the incoming gas line or header which in turn feeds the compressors. These supports are spanned by an I-beam in each instance that is heavy enough and long enough to accommodate other lines. Each compressor engine is serviced by a separate unit and each unit is supported by the main gas header.

Operating Ideas

Cable Prevents Rotary Hose Slapping

On slim-hole rigs using jack-knife derricks it sometimes is a problem to keep the rotary hose from slapping against the derrick. This not only is disquieting but also can cause unnecessary wear on the hose and strain on the derrick. Various means have been devised to minimize this slapping, but an unusually satisfactory method is used by a drilling contractor in the East Tecumseh field, Oklahoma. A steel cable is attached to the derrick man's platform and snubbed to the pipe rack. The hose plays up and down this cable attached to a pulley, holding the hose free from the derrick at all times.

Wire-Line Lifting Loop on Skid

To prevent severe wear and tear on a good winch line and save time and trouble of slipping a line around the end of a partly buried skid on a drilling-rig unit to move it, a Texas contractor passes a short loop of discarded wire or drilling line around the center member of the skid, and fastens the ends with wire clamps. This provides a ready means of hooking on for moving the skid. This line then takes all the severe service of lifting. The portion of the loop normally lying under the skid crossmember may be pulled up for inspection simply by hooking on to the clamped portion, which normally lies across the skid.

Globe Valve Made Into Relief Unit

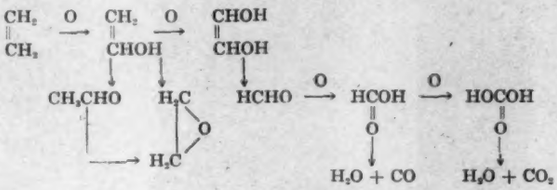
A satisfactory relief unit for use on a fresh-water line to a rig operating in East Texas was made from an old globe valve. The threads on the valve stem were cut off and filed smooth, and the top of the stem welded to a heavy piece of bar iron. A similar piece was prepared as a guide. Pins of heavy rod were then welded to two nipples the same size as the valve, and holes were bored through the guides to fit the pin spacing. By setting the globe valve so that water pressure was below the disk, and putting heavy springs between the two bars, it was easy to set the valve to lift at any pressure within the range of spring compression, by turning down on the nuts at the tops of the two pins. The usual stem packing was used, being adjusted by means of the nut formerly relied upon to keep the bonnet tight.

The *OXIDATION* of Aliphatic Hydrocarbons (Part 3)

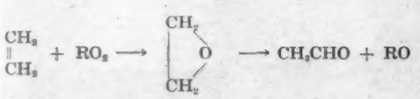
By GUSTAV EGLOFF, D. V. NORDMAN, and P. M. VAN ARSDELL
Universal Oil Products Co., Chicago, Ill.

EDITOR'S NOTE: Second half of section in series discussing the halogenation, oxidation, and nitration of paraffin hydrocarbons. The series started August 20. Here the use of catalysts in oxidizing certain pure hydrocarbons is emphasized. It might be pointed out that work on oxidation reactions, in general, may be divided into two main groups—the first having to do with combustion reactions where attention is centered upon fuel qualities inherent in certain hydrocarbons; and the second being mainly interested in forming the intermediate compounds for use in industry as solvents of various types. From a commercial viewpoint, both types of oxidation are extremely important.

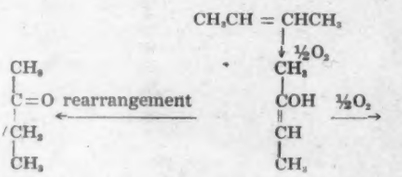
THE hydroxylation theory advanced for saturated hydrocarbons was also applied to alkenes:[77]



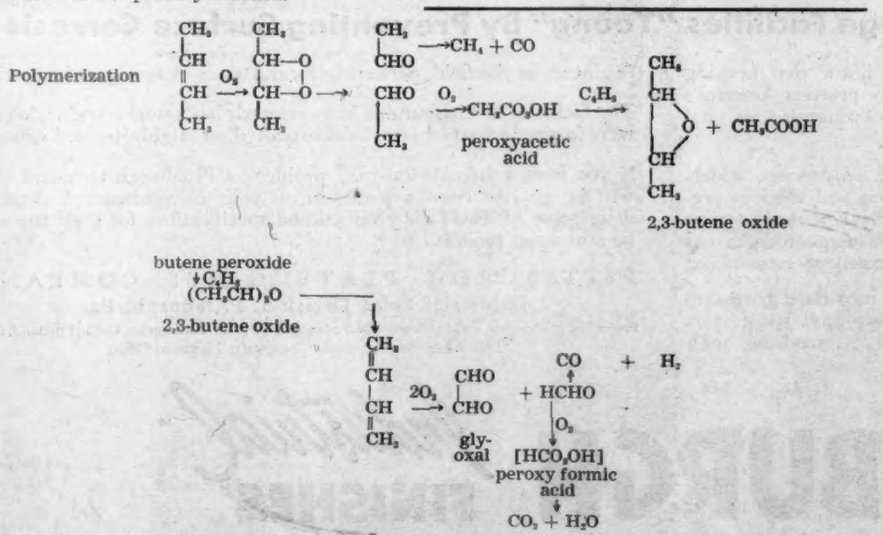
According to the peroxidation theory, the primary reaction of ethene and oxygen yields a peroxide which reacts further with the alkene to produce alkene oxides. The unstable oxide decomposes to aldehyde, and complete oxidation of the aldehyde follows:[86]



Oxidation of 2-butene indicated the probability of peroxidation as the primary reaction.[85] If hydroxylation predominates, the following scheme explains the reaction:



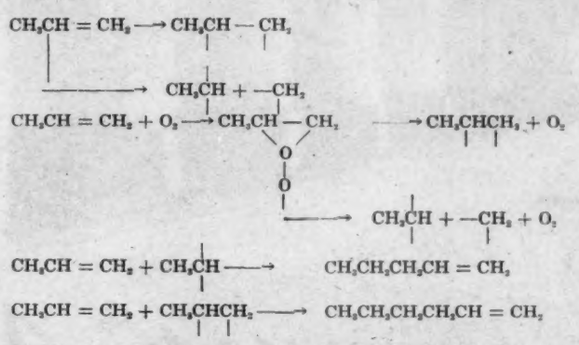
Such ketone formation was not substantiated by experimental evidence. The acetaldehyde, butadiene, alkene oxide, acids, glyoxal, and water found in the 2-butene oxidation products are, however, accounted for by a mechanism in which peroxidation is the primary reaction.

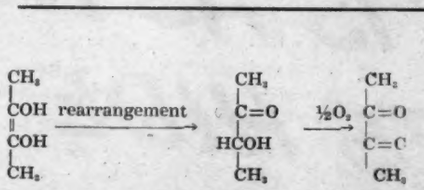


[86]Mardles, Trans. Faraday Soc. 27, 681 (1931).

A reaction mechanism involving activation of the double bond has been outlined for alkanes.[82]

This theory explains the presence of higher alkenes as is shown for propene.





B. Catalytic Oxidation of Alkenes

Thermal oxidation of alkenes to intermediate products and hydration to alcohols have been carried out in the presence of catalysts. Nitric oxide additions to ethene-oxygen reaction mixtures shortened both the induction and reaction periods.[78] Ether accelerated propene oxidation.[84] The pentene isomers, 1- and 2-pentene, 2-methyl-1-butene, 3-methyl-1-butene, and 2-methyl-2-butene, were oxidized over cobaltous oleate.[87] 2-methyl-2-butene was also oxidized over manganese vanadate.[80] Maleic acid has been prepared by oxidation of 2-pentene, 2-methyl-2-pentene, hexene, and heptene in the presence of vanadium pentoxide.[88] Better yields of acid were obtained from the higher alkenes. Thermal reactions are shown in Table 4.

Catalytic hydration[89] of the alkenes did not receive much attention prior to 1920. This reaction has not been entirely successful since most catalysts become effective only at temperatures high enough to displace the equilibrium toward the alkenes. Vapor-phase hydrations of ethene over different catalysts produced consistently low yields of alcohol.[90]

Cadmium metaphosphate[91] which was used in the hydration of ethene at atmospheric pressure deteriorated at temperatures above 150°. Alumina and tungstic oxide catalysts were also used, and the products included ethyl acetate, acetic acid, acetaldehyde, and polymerization products.[92] Tungstic oxide produced a higher yield of acetic acid due, possibly, to the reduction of the catalyst by ethyl alcohol formed at the beginning of the reaction. An unsuccessful attempt to hydrate

[87]Hyman and Wagner, J. Am. Chem. Soc. 52, 4345 (1930).
[88]Faith and Dendurent, Ref. and Nat. Gas Mfg. 18, 393 (1939).
[89]Shiffler, Holm, and Brooke, Ind. Eng. Chem. 31, 1099 (1939).
[90]Sanders and Dodge, Ind. Eng. Chem. 26, 208 (1934).
[91]Applebey, Glass, and Horsley, J. Soc. Chem. Ind. 56, 279 (1937).
[92]Bliss and Dodge, Ind. Eng. Chem. 29, 19 (1937).

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ethene and propene in the presence of halogen acids was made.[84] Sulfuric acid[85] was also used to catalyze ethene and propene hydrations but an increase in acid concentration increased polymerization. Sulfuric acid was not used with butene or higher homologs since polymerization predominates with this reagent. 2-Butene has been hydrated in the presence of cuprous chloride, thoria, and phosphoric acid.[86] 2-Methyl-1-propene and 2-methyl-2-butene were hydrated in the presence of potassium nitrate and nitric acid.[87,88] Other acids were used with 2-methyl-2-butene and the catalytic influence of 0.1 molar solutions were dithionic sulfuric hydrochloric, hydrobromic nitric p-toluene-sulfonic picric oxalic acetic.

TABLE 4—THERMAL OXIDATION OF ALKENES

Hydrocarbon	Reaction conditions: Temperature	Reaction conditions: Pressure	Reaction products
Ethene	300°-525°		Ethene oxide and formaldehyde. Further oxidation yielded dioxymethyl peroxide, acetaldehyde, formic acid, CO, CO_2, and water.
	Above 500°		Polymerization.
Ethene			Aldehydes and unsaturated alcohols previous to oxide or peroxide formation.
Propene			Similar oxidation products to ethene and also decomposition. Polymerization.
Isobutene			More rapid reaction than ethene.
2-Butene	Below 450°		2,3-butene oxide. *Butadiene.
2-Butene	450°		Increased polymerization.
	Above 500°		Free carbon.

*Note formation of hydrocarbon.

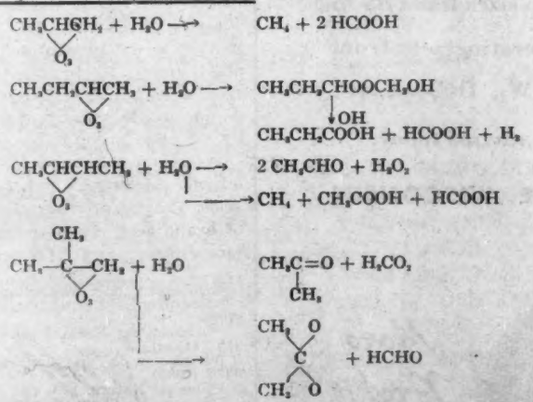
Table 5 shows in condensed form the reactions and their products discussed in the catalytic oxidation of alkenes and also the oxidants other than oxygen gas.

TABLE 5—CATALYTIC OXIDATION OF ALKENES

Hydrocarbon	Reaction conditions: Temperature	Reaction conditions: Catalyst	Reaction products
Ethene		Nitric oxide	Shortened induction and reaction period.
Ethene hydration		Tungstic oxide	Ethyl acetate, acetic acid, acetaldehyde. Polymerization products.
Ethene hydration	Below 150°	Cadmium metaphosphate	Alcohol.
Ethene hydration		Sulfuric acid	Alcohols. Polymerization at high sulfuric-acid concentration.
Propene		Ether	Accelerated propene oxidation.
2-Butene		CuCl2 thoria and phosphoric acid	Hydration products.
2-Methyl propene		CuCl2 thoria and phosphoric acid	Hydration products.
Pentenes:			
Pentene-1		Cobaltous oleate	Oxidation products, maleic acid.
Pentene-2			
2-methyl-butene-1		Vanadium pentoxide	
2-Methyl-butene-2		KNO_3 and HNO_3	Hydration products.
3-Methyl-butene-1			
Hexene		Vanadium pentoxide	Maleic acid.
Heptene		Vanadium pentoxide	Maleic acid.
Ethene and ozone	400°		Explosion at 400°.
Ethene and ozone			Anhydrous ozonide, formic acid and formaldehyde. Decomposition in the presence of H_2O. Dioxymethyl peroxide.
Ethene		Osmium tetroxide	No products given.
Ethene		Selenium dioxide	Trimeric glyoxal.
Propene ozonide	—80°		Hydrolysis, methane and formic acid.
Propene		Osmium tetroxide	Hydrolysis, methane and formic acid.
Butene ozonide 3,4			1-Hydroxy-2-butyric acid. Propanoic acid and formic acid.
Butene ozonide 2,3			Acetaldehyde and hydrogen peroxide, also methane, acetic and formic acid.
Isobutyl ozonide			Dimethyl ketone and H_2CO_3 also CH_3 C O and formic acid. CH_3 O
2-Butene		Peracetic acid	Cyclic oxide at double linkage, and subsequent formation of a glycol or glycol acetate.
1- and 2-Pentene		Peracetic acid	Cyclic oxide at double linkage, and subsequent formation of a glycol or glycol acetate.
2-Methyl-1-butene		Peracetic acid	Cyclic oxide at double linkage, and subsequent formation of a glycol or glycol acetate.
1-, 2-, and 3-Hexene		Peracetic acid	Cyclic oxide at double linkage, and subsequent formation of a glycol or glycol acetate.
1- and 3-Heptene		Peracetic acid	Cyclic oxide at double linkage, and subsequent formation of a glycol or glycol acetate.
2-Methyl-1-hexene		Peracetic acid	Cyclic oxide at double linkage, and subsequent formation of a glycol or glycol acetate.

C. Use of Oxidants Other than Oxygen Gas

Ozone has been used to a limited extent in alkene oxidation. The ozone acts as an oxidant and also as a catalyst for the alkene oxygen reaction. Mixtures of ethene and oxygen[97] normally become explosive at temperatures above 500°, but in the presence of ozone, explosive reactions occurred around 400°. Decomposition of the anhydrous ozonide resulted in formic acid and ofrmaldehyde, while decomposition in the presence of water produced dioxymethyl peroxide and some hydrogen.[98] Ozonides[99] of propene and butenes have also been hydrolyzed at —80°.



Mixtures of alkenes containing up to 14 carbon atoms and having one or more of the branches methyl, ethyl, *n*-propyl, *n*-butyl, or *n*-pentyl have been ozonized.[100] Products from the decomposition of the ozonides varied with the alkene mixtures and with the solvents used.

Ozonides of the higher olefins derived from lignite and coal are reacted with water or steam to form acids. The reaction involves splitting at the double bond and hydrolysis to the acids which are separated by means of a hot caustic potash solution. Palmitic and stearic acids are formed after hydrolyzing the potassium soaps. The process yields about 20 per cent by weight of acid from the hydrocarbon reacted. Edible fats[101] are produced by this process, and they were used in Germany both during the past World War and during the present one to offset the scarcity of natural fats. The hydrocarbons used for fat manufacture are derived from the hydrogenation and Fischer-Tropsch processes as well as from natural petroleum.

Cis glycols which have not been widely investigated are formed by the reaction of alkenes and hydrogen peroxide in the presence of cata-

[84]Swann, Snow, and Keyes, Ind. Eng. Chem. 22, 1048 (1930).
[85]Marek and Fledge, Ind. Eng. Chem. 24, 1428 (1932).
[86]Lucas and Eberz, J. Am. Chem. Soc. 56, 460 (1934).
[87]Lucas and Liu, J. Am. Chem. Soc. 56, 2138 (1934).
[88]Spence and Taylor, J. Am. Chem. Soc. 52, 2309 (1930).

[97]Briner and Schnorf, Helv. Chim. Acta 12, 154 (1929).
[98]Briner and Meier, Helv. Chim. Acta 12, 529 (1929).

[99]Church, Whitmore, and McGrew, J. Am. Chem. Soc. 56, 176 (1934).
[100]Harries, German Patent 339,562 (1919).

lysts.[102,103] Inasmuch as hydrogen peroxide without a catalyst has no effect on an alkene double linkage, catalytic action may consist of splitting of hydrogen peroxide into hydroxyl radicals which then add to the double bond.[104] Osmium tetroxide catalyzes the hydrogen peroxide reaction with ethene, propene, isobutene, 2-pentene, 2-methyl-1-butene, 2-methyl-2-butene, 3-hexene, and 1,5 hexadiene. The glycol was obtained from 2-methyl-2-butene[104] oxidized by hydrogen peroxide with vanadium pentoxide or chromium trioxide. A pentene hydrogen peroxide reaction over ferrous sulfate yielded acetone, acetaldehyde, formic acid, and carbon dioxide, but no glycols were detected.[105]

[102]Milas and Sussman, J. Am. Chem. Soc. 58, 1302 (1936).
[103]Milas and Sussman, J. Am. Chem. Soc. 59, 2345 (1937).
[104]Milas, J. Am. Chem. Soc. 59, 2342 (1937).

Selenium dioxide and ethene reacted slightly at room temperature.[106] Trimeric glyoxal was the predominant product, but the monomeric form was obtained when a mixture of selenium dioxide and phosphorous pentoxide was used as oxidant. The propene reaction was similar to that of ethene, but higher alkenes reacted only at elevated temperatures and produced mixtures too complex for analysis. In the oxidation of 2-methyl-2-pentene by selenium dioxide, one of the methyls adjacent to the double bond was the point of initial action,[105] but in 3-methyl-2-pentene the methylene group, $-CH_2-$, adjacent to the double bond, was first oxidized.[107]

Oxidation of alkenes with dilute potassium permanganate results in the addition of two hydroxyl groups at the point of unsaturation. Prolonged oxidation or use of more concentrated acid causes complete oxidation to carbon dioxide and water. When higher alkenes are oxidized with potassium permanganate, scission occurs at the double bond, producing two acids. This reaction is used as a test for the point of unsaturation of alkenes.

[105]Barkhash, J. Gen. Chem. (U.S.S.R.) 5, 254 (1935); C.A. 29, 5067 (1935).
[106]Guillemonat, Compt. rend. 200, 1416 (1935).
[107]Guillemonat, Compt. rend. 201, 904 (1935).

Peracetic acid has been used to oxidize 2-butene, 2-methylpropene, 1- and 2-pentene, 2-methyl-1-butene, 1-, 2-, and 3-hexene, 1-, and 5-heptene, and 2-methyl-1-hexene.[108,109] In these reactions a cyclic oxide was formed at the double linkage with subsequent formation of a glycol or glycol acetate.

$$-C=C- + CH_3COOOH \rightarrow -C(O)C- + CH_3COOH$$

The velocity of the primary reaction was not affected by the secondary reaction.[109] An alkyl group attached to an unsaturated carbon atom increased the rate of reaction.

Oxidation of the alkadienes, 3-methyl-1,2-butadiene and 1,5-hexadiene with peracetic acid occurred at one of the double bonds, and methylated unsaturated carbon atoms reacted most readily.[109,109]

4. Oxidation of Alkynes

Very little work has been done on the oxidation of alkynes, and practically none on the homologs above ethyne. The ethyne-oxygen reaction which gives glyoxal, formaldehyde, formic acid, hydrogen, and monoxide and dioxide of carbon,[17,110] is apparently chain propagated[111,123] since an induction period[111] and inhibition by an excess of oxygen were noted.[110] At high pressures, increased surface-volume ratio lowered the reaction rate while at low pressures, similar surface changes had a slight accelerating influence.[114] Velocity was dependent upon hydrocarbon concentration as long as it was not in great excess.[111] Potassium chloride[115] coating of the vessel and nitrogen[110] dilution of the ethyne-oxygen mixture had a slight retarding effect. Glyoxal and formaldehyde cannot be important chain carriers since the former had little influence on ethyne oxidation and the latter had an inhibitory effect.[114]

Ethyne has been oxidized in the presence of nitrogen oxides and a few metals. Nitrogen peroxide lowered appreciably the reaction temperature of ethyne and oxygen,[116] and the principal product was glyoxal.[110] Copper, silver, gold, nickel, iron, and platinum were also used as catalysts for the complete oxidation of ethyne.[117]

Methyl alcohol, acetone, and acetic acid were used as solvents for 1-hexyne, heptyne, and octyne which were hydrated in the presence of sulfuric acid and mercuric sulfate.[118] With sulfuric acid, 2-pentyne was hydrated at 0° to produce diethyl ketone.[119] In the sulfuric acid hydration of a series of alkynes, $CH_3C{\equiv}CR$, the relative activity[119] of the unsaturated carbon to which the alkyl group, R, is attached increases with increased length of R. This change in activity may be due to the polarity of the triple bond induced by the alkyl group.[119]

Potassium permanganate[120] was used to oxidize ethyne, 2-pentyne, and 3,3-dimethyl-1-butyne to acids. Ethyne produced formic acid and a trace of oxalic acid; 2-pentyne formed acetic and propionic acids; and 3,3-dimethyl-1-butyne gave tri-

[108]Boeseken, Rec. trav. chim. 54, 657 (1935).
[109]Boeseken and Stuurman, Rec. trav. chim. 56, 1034 (1937).
[110]Spence and Kistiakowsky, J. Am. Chem. Soc. 52, 4837 (1930).
[111]Kistiakowsky and Lenher, J. Am. Chem. Soc. 52, 3785 (1930).
[112]Spence, Nature, 128, 153 (1931).
[113]Spence, J. Chem. Soc. 1932 (686).
[114]Steacie and McDonald, J. Chem. Phys. 4, 75 (1936).
[115]Lenher, J. Am. Chem. Soc. 53, 2962 (1931).
[116]Lenher, J. Am. Chem. Soc. 53, 3737 (1931).
[117]Davies, Phil. Mag. 23, 409 (1937).
[118]Thomas, Campbell, and Hennion, J. Am. Chem. Soc. 60, 718 (1938).
[119]Mowat and Smith, J. Chem. Soc. 1938, 19.
[120]Krestinsky and Kelbowskaja, Ber. 512 (1935).

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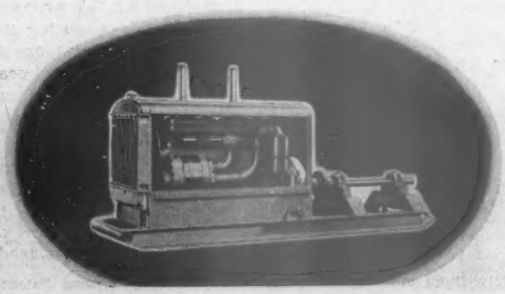

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methyl acetic and formic acids together with some carbon dioxide. In these reactions it is probable that any primary addition product immediately splits at the unsaturation.[120] An ozonide obtained from 1-heptyne and ozone was hydrolyzed to acids:[121]

$$C_5H_{11}C{=}CH + H_2O \longrightarrow C_5H_{11}COOH + HCOOH$$
$$\diagdown\!\diagup$$
$$O_3$$

Selenium dioxide in alcohol was used to oxidize 1-heptyne and 1-octyne.[122] The initial reaction was the substitution of a hydroxyl radical on the carbon atom adjacent to the unsaturated carbon. The action of selenium dioxide on a methylene group adjacent to a point of unsaturation was also noted with 2-methyl-2-pentene.[107] Ethyne and oxygen saturated with water vapor and illuminated by a mercury arc produces oxalic acid and an aldehyde.[123]

The theories of peroxidation, hydroxylation, and bond activation, which were offered for the more saturated hydrocarbons, may also be applied to the alkynes.[89 124 125] Although ethyne does not appear to form peroxides, it may polymerize to higher alkynes which then undergo peroxidation.[126] An unstable peroxide has been isolated as an intermediate oxidation product of 1-hexyne.[127]

Table 6 gives a digest of alkyne oxygen reactions discussed in this section.

TABLE 6—OXIDATION OF ALKYNES

Hydrocarbon—	Reaction conditions— Temperature	Pressure	Reaction products—
Ethyne-oxygen			Glyoxal, formaldehyde, formic acid, hydrogen, CO, and CO_2.
	Temperature	Catalyst	
Ethyne-potassium chloride		Nitrogen dilution	Glyoxal and formaldehyde.
Ethyne-oxygen and water		Hg arc	Oxalic acid and an aldehyde.
Ethyne		$KMnO_4$	Formic acid and trace of oxalic acid.
Ethyne		Nitrogen peroxide	Glyoxal.
2-Pentyne		$KMnO_4$	Acetic and propionic acids.
2-Pentyne		H_2SO_4 and $HgSO_4$	Diethyl ketone.
1-Hexyne		H_2SO_4	Hydration products.
3,3-Dimethyl-1-butyne			Trimethylacetic acid and formic acid and CO_2.
Heptyne		H_2SO_4	Hydration products.
Heptyne ozonide		Selenium dioxide	$C_5H_{11}COOH$ and formic acid.
Heptyne in alcohol		Selenium dioxide	Substitution of hydroxyl radical on carbon adjacent to unsaturation.
Octyne		H_2SO_4	Hydration products.

[121] Paillard and Wieland, Helv. chim. Acta 21, 1356 (1938).
[122] Truchet, Compt. rend. 196, 706 (1933).
[123] Livingston, J. Am. Chem. Soc. 53, 3909 (1931).
[124] Bone, Proc. Roy. Soc. 162A, 502 (1937).
[125] Bodenstein, Z. physic. Chem. 12B, 151 (1931).
[126] Young, Vogt, and Nieuwland, J. Chem. Soc. 1935, 115.
[127] Young, Vogt, and Nieuwland, J. Am. Chem. Soc. 58, 55 (1936).

Questions and Answers

Is there any danger, other than asphyxiation, from carbon monoxide? What precautions are necessary when handling this gas?—A. B. P.

Besides being toxic, the carbon monoxide is explosive when mixed with air over a considerable range. Mixtures of air and carbon monoxide within the range of 12.5 to 74.2 per cent are dangerous. Adequate ventilation to dilute the carbon monoxide below the explosive mixture point is necessary when manufacturing or handling this gas. Carbon monoxide will result from the incomplete combustion of practically any fuel.

It may be well to remember that carbon monoxide produces a true poisoning. The white corpuscles are affected so they cannot absorb oxygen. The typical symptoms of carbon monoxide poisoning are headache and dizziness and when working around internal-combustion engines or carbon monoxide generators workers should be cautioned to cease work immediately if they notice susceptibility to such ailments. Adequate ventilation is always a good preventive, but if much of this gas is known to be present, men should be equipped with an all-service gas mask or a hose-type mask.

The time for the gas to effect a human varies with physical condition of the men. The following table gives the time for a norman human to be affected by various concentrations of carbon monoxide.

CO p.p.m. in air	Mild symptoms	Severe symptoms
100	5-6 hrs.	.....
200	5-6 hrs.	.....
300	3-4 hrs.	4-5 hrs.
400	1½-2½ hrs.	2½-4 hrs.
500	1-2 hrs.	2-3 hrs.
600	¾-1½ hrs.	1½-2 hrs.
700	20-40 min.	40-80 min.
1,000	10-30 min.	30-60 min.
1,500	3-5 min.	15-45 min.

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QUESTIONS ON TECHNOLOGY

By W. L. NELSON, Technical Editor

Chemistry of Making Butadiene (for Rubber)

We have heard so little of the actual methods of making butadiene that we hardly know whether we have the proper materials for its manufacture. Can you tell us the chemistry by which this material is made?—J. C. K.

Little has been published about the actual plant operations which have been used in butadiene manufacture and hence only a few of the barest chemical reactions can be given here.

By pyrolysis.—Most high-temperature (1,000-1,500° F.) low-pressure (500-100 mm. or this partial pressure) cracking or decomposition processes yield some butadiene. The yields vary greatly, ranging from 1 to 23 per cent, according to laboratory research workers (C. Ellis, Vol. 2, Chemistry of Pet. Derivatives, Reinhold Publ. Corp., N. Y., 1937) and in one instance, i.e., the pyrolysis of cyclohexane hydrocarbons at 1,200-1,380° F. in the presence of 1.5-4 volumes of steam, yields of 12 to 65.2 mol per cent are said to be possible (p. 172). Some of the materials which are reported in the above reference are ethylene, propane, butene, isobutene, cyclohexane, petroleum oils, cylinder stock and cracking stocks.

Oils or hydrocarbons (diluted with inert gas) = heat → Butadiene plus other products

This is the basis of the thermal dehydrogenation processes for making butadiene from butanes—and also the operation of cracking plants for gasoline manufacture and at the same time small yields of butadiene. When cracking M.C. napthene at nearly atmospheric pressures the yields of butadiene are said to be somewhat as follows:

1,000° F.—0.4%	1,200° F.—2%
1,100° F.—1.2%	1,400° F.—3.8%

Catalytic dehydrogenation.—This is the basis for the butane dehydrogenation processes explored by Universal Oil Products Co. and Houdry Process Corp. A common catalyst for such processes is chromic oxide supported on activated alumina (Ind. Eng. Chem. 32, 268 and 309, 1940).

$$\underset{\text{Butane}}{C_4H_{10}} \rightarrow \underset{\text{Butene}}{C_4H_8} + \underset{\text{Hydrogen}}{H_2}$$

$$\underset{\text{Butene}}{C_4H_8} \rightarrow \underset{\text{Butadiene}}{C_4H_6} + \underset{\text{Hydrogen}}{H_2}$$

Final yields up to 76 per cent butadiene are reported in laboratory work.

Alcohol process.—The Lebedev process used on an industrial scale in Russia involves passage of alcohol over an alumina zinc oxide catalyst at 420°-470° C., and results in a yield of 20 per cent which probably can be increased by recycling.

$$\underset{\text{Ethanol}}{2C_2H_5OH} \rightarrow \underset{\text{Butadiene}}{C_4H_6} + \underset{\text{Water}}{2H_2O}$$

Butyl alcohol or chloride process.—Normal butyl alcohol, a product of petroleum or of starch fermentation, is chlorinated in the presence of sunlight to form a mixture of dichlorobutanes.

$$\underset{n\text{-Butyl alcohol}}{C_4H_9OH} + \underset{\text{Chlorine}}{Cl_2} \rightarrow \underset{\text{Dichlorobutanes}}{C_4H_8Cl_2} + \underset{\text{Water}}{H_2O}$$

This mixture reacts with sodium carbonate at 470° C., yielding butadiene.

$$\underset{\text{Dichlorobutanes}}{C_4H_8Cl_2} + \underset{\text{Sodium carbonate}}{Na_2CO_3} \rightarrow \underset{\text{Butadiene}}{C_4H_6} + \underset{\text{Salt}}{2NaCl} + \underset{\text{Water}}{H_2O} + \underset{\text{Carbon dioxide}}{CO_2}$$

Acetylene or Aldol process.—Butadiene can be made in large yields by the polymerization of acetaldehyde to aldol or aldol hydrate which can be easily converted into butadiene. Starting from acetylene—

$$\underset{\text{Acetylene}}{C_2H_2} + \underset{\text{Water}}{H_2O} \xrightarrow[\text{catalyst}]{\text{Acid and}} \underset{\text{Acetaldehyde}}{CH_3\cdot CHO}$$

$$\underset{\text{Acetaldehyde}}{2CH_3\cdot CHO} \xrightarrow[\text{solution}]{\text{Carbonate}} \underset{\text{Aldol}}{CH_3\cdot CH\cdot (OH)\cdot CH_2\cdot CH:O}$$

$$\underset{\text{Aldol}}{C_4H_8(OH)_2} \xrightarrow[270^\circ\text{ C.}]{NaH_2PO_4\text{ at}} \underset{\text{Butadiene}}{C_4H_6} + \underset{\text{Water}}{2H_2O}$$

or as much as indicated above under butyl alcohol—

$$\underset{\text{Aldol}}{C_4H_8(OH)_2} + \underset{\text{Hydrochloric acid}}{HCl} \rightarrow \underset{\text{Dichlorobutane}}{C_4H_8Cl_2} + \underset{\text{Water}}{H_2O}$$

$$\underset{\text{Dichlorobutane}}{C_4H_8Cl_2} + \underset{\text{Sodium carbonate}}{Na_2CO_3} \rightarrow \underset{\text{Butadiene}}{C_4H_6} + \underset{\text{Salt}}{2NaCl} + \underset{\text{Carbonic acid}}{H_2CO_3}$$

This process is not entirely a laboratory-scale process because acetaldehyde has for many years been made commercially in large amounts by this process.

In addition there are doubtless many other processes which cannot be enumerated here because of lack of space. The general public is greatly confused because of the fact that alcohols (both grain and butyl) can be made from numerous materials such as wheat, potatoes, starch, sawdust, wood pulp, garbage, etc., and in a similar manner the butanes or acetylene can be made by the pyrolysis of nearly any carbon-hydrogen materials such as petroleum products, natural gas, coal, coke, wood, etc., if the cost of these processes can be countenanced.

The fact that petroleum, butanes and alcohol are mentioned most frequently is due to the ready accessibility of these materials, their cheapness, and the directness with which butadiene can be made from them. In the order of the cost of the raw stock (considering final yield of butadiene), the lowest cost material is butane, followed by petroleum products and alcohol, respectively.

Handling of Corrosive Chlorides and Acid in the Petroleum Chemical Industry

We note your suggestion that cuprous chloride might be used for extracting butadiene in rubber manufacture. What materials can be used to hold a corrosive liquid?—D. W. W.

Few materials are more difficult to handle than cuprous chloride, ferric chloride, hydrochloric acid particularly when concentrated or hot, and chlorine. They can be handled in various nonmetallic materials such as glass, ceramics ware, certain plastics, notably Haveg, etc., but these materials are not entirely suitable for many construction purposes.

Among metallic materials, the copper-base alloys such as brass, bronze, cupro-nickel, nickel silver, monel metal, etc., have been useful in resisting the corrosion of very dilute salt brines but they are of little value with dilute hydrochloric acid, or even somewhat dilute cuprous or ferric chlorides. For many years metallic silver was the common material for the construction of hydrochloric acid absorbers and stills but recently metallic tantalum has been used more and more extensively. In general these expensive materials are used in thin sections as lining materials. Due to their high resistance to corrosion they can be used in the minimum section suitable for mechanical strength. Finally, cast-type materials such as Durachlor or the high-silicon irons containing 3-4 of molybdenum, are said (The Oil and Gas Journal, June 15, 1939, p. 62) to be 8 to 10 times as resistant to hydrochloric acid corrosion as regular Duriron or Tantiron. A somewhat similar type of alloy is Hastelloy B which is a nickel-iron-high-molybdenum alloy which has been developed specifically for the purpose of withstanding hydrochloric acid. (The Oil and Gas Journal, June 17, 1937, p. 65). As compared with the silicon irons which must be cast, Hastelloy B can be wrought. The Germans and Russians appear to have been particularly active in the development of the high-molybdenum (3-4 per cent) alloys for resisting hydrochloric acid.

Much ingenuity has been exhibited by the engineers of Fansteel Metallurgical Corp. in the design of tantalum equipment for processing hydrochloric acid and similar corrosive materials. The metal tantalum is expensive and hence compact, high-capacity equipments such as condensers, heat exchangers, and absorption towers have been developed. These equipments are reinforced or housed in base metal and by careful design the amount of tantalum for lining purposes is kept at a minimum. Although silver is considered as an expensive material, it is available in abundance and it would seem that silver could be kept in commercial equipment with safety as well as in money vaults. Besides the availability of silver in stocks of the refined alloy, the country is capable of producing substantial quantities.

The materials enumerated above can often be used for hydrobromic acid, bromides, etc., as well as hydrochloric acid but most of them are not suitable for hydroflouric acid.

CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

DRILLING MUD

OCTOBER 8, 1942

MUD COST DEPENDS ON YIELDS

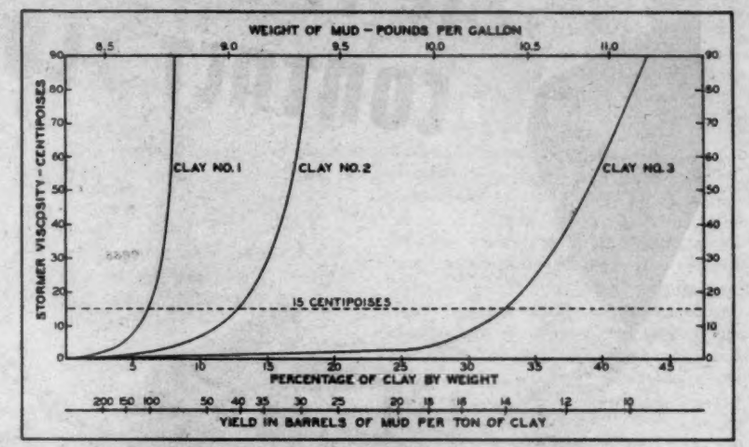
IN considering drilling-mud costs, an operator sometimes is confused in making a choice of the available commercial clays to be used by the wide variation in their costs per ton. Unless the operator gives this point careful consideration, he often spends more money than is necessary. The true way to evaluate a drilling clay with another clay is to compare it on a basis of cost per barrel of mud rather than on a cost per ton.

In order to do this, the operator must know the yield in barrels per ton of mud of given weight and viscosity characteristics so that the mud can be compared on an equal basis to the other clays which are available. Usually drilling clays of low-specific-gravity range are compared on the basis of how many barrels of mud with a viscosity of 15 centipoises, 1 ton will yield. The accompanying figure shows the yield characteristics of three types of clays which are usually available to operators in most areas. No. 1 is a bentonite clay; No. 2 is a finely ground, high-grade processed clay, and No. 3 is a poorly ground, gritty, brick-yard type clay. All three clays will have a specific gravity of approximately 2.3.

To make use of the curves as shown in the figure, assume a drilling well has encountered loss of circulation to such an extent that all of the reserve mud has been used, and it is now necessary to buy commercial clays to replace the needed volume. It is a natural impulse on the part of the operator to buy the cheapest clay available on a cost-per-ton basis. The average field costs of these clays are as follows: Clay No. 1, $42 per ton; clay No. 2, $30 per ton, and clay No. 3, $15 per ton. On the basis of 15 centipoises mud (approximately 35 seconds on standard A.P.I. Marsh funnel field test), the following tabulations can be made :

	Bbl. required	Yield bbl./ton	Total tons required	Cost per ton	Cost per bbl. mud	Total cost
Clay No. 1	500	80 to 100	6.25	$42	$0.525	$262.50
Clay No. 2	500	40 to 50	12.5	30	0.75	375.00
Clay No. 3	500	14 to 18	35.71	15	1.07	535.00

The cost per barrel and tons required have been calculated on the lowest possible yield in barrels per ton. This factor of course is controlled by the manner and care taken in mixing the clays.



Yield characteristics of three types of clays in common use

Other factors should also be considered in making the decision of which clay should be used. Usually in overcoming lost circulation, it is desirable to have a drilling mud as low in weight as can be obtained. This lower weight mud will reduce the hydrostatic pressure on the porous formation to a minimum, and will give the operator an additional advantage of regaining and maintaining circulation. By referring to the figure again, it will be noted clay No. 1 will produce a mud weighing 8.8 lb. per gallon; clay No. 2 will weigh 9.1 lb. per gallon, and clay No. 3 will weigh 10.4 lb. per gallon. Again clay No. 1 would be the best choice.

Another consideration is that clay No. 3 due to its poor yield and coarse nature, will usually require the addition of some bentonitic material to keep it in suspension so that the operator will not have the additional hazards of sticking the drill pipe by settling of the mud in the hole when circulation is stopped. Clay No. 2 should also have some bentonitic material added, but to a much lesser degree.

Still another consideration is the quality of the resultant drilling muds aside from their weight, viscosity, and sand or grit content. Actually, the most important single characteristic of a drilling fluid is its water loss as measured on the filter press. This gives the operator the key to the actual performance of the mud in the hole. This characteristic is best achieved through the use of bentonitic clays which are colloidal in nature. The water loss of clay No. 3, and to some extent in clay No. 2, is high due to a predominance of large particles and the absence of colloids. Most operators feel that if the mud is to be lost to the formation, this characteristic is not important. This is a dangerous assumption, because there usually are several thousand feet of open hole to be protected while regaining circulation and when this portion of the hole is exposed to poor quality muds, it may start the shales to sloughing or the filter cake may become excessively thick in other porous sections. Both conditions introduce the additional hazard of sticking the drill pipe and the further complication of the hole.

It takes very little effort on the part of the operator to investigate the commercial clays which are offered. This can be done with only a minimum amount of equipment and in most cases the clay company, if at all reputable, can and will be glad to furnish tests on his mud. If it will not, the operator should proceed with caution while using his products. Tests on a few gallons of a mud are a much cheaper way of learning about a clay.

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CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL — WELL LOGGING

OCTOBER 8, 1942

RELATIVE COSTS OF ELECTRICAL LOGS AND CORES ARE VARIABLE

THE value of core analysis as compared to electrical logging is still a much debated subject. No attempt is being made here to compare these two services on such a basis; instead this is solely an analysis of the costs. In general it can be said that for an analysis of a particular section, core analysis is more applicable and for an entire well the electrical log should be used. Again in considering value it is not as yet common practice with the majority of the operators to have all cores analyzed. The operator who understands technical considerations well enough to appreciate the worth of core analysis is usually anxious to also avail himself of the electrical log.

A great many operators, however, and this includes many major companies, cause countless cores to be taken which give service only by helping to fill the slush pit. The background for this is perhaps the old custom of the drilling contractor furnishing two or three cores to the well. In such cases there is little argument concerning the value of the two services.

Casing Points Selected

Many operators core to select casing seats in pool wells. In such cases the cores seldom are analyzed and are usually retained only long enough for a visual examination. Invariably after a few test wells an operator will be able to use the two services interchangeably. In most fields the same will be found true in determining the oil-water levels as well.

Casting aside all questions of accuracy of information, etc., let us examine the two services on a cost basis. With electrical logging the cost may be calculated easily. Cost is based on mileage to and from the nearest field office, a flat charge for the use of the equipment plus a charge per foot of hole surveyed. Normally there is no charge for time spent at the well. These variables may be approximated for the average shallow well of 1,500 ft., as follows:

Mileage, 50 miles at 15c	$7.50
General charge	80.00
1,500 ft. of hole surveyed at 5c	75.00
Total log charge	$162.50
1½ hr. round trip	$18.75
2 hr. down time	20.00
Total cost of survey	$201.25

To obtain comparable coring costs it is necessary to determine an average amount of coring on wells. In many cases, particularly in Kansas, when coring into the pay, only one core will be taken. On the other hand, in Illinois sand wells three cores are perhaps closer to the average. For convenience, consider that two cores are taken. In shallow coring wire-line core barrels are seldom used. Each core requires a round trip. To keep costs as low as possible the average operator would attempt to run one core bit and entirely eliminate any possible reaming time. Estimated costs of coring under such circumstances would be:

Cost 2 roundtrips, 1½ hr. each	$37.50
Cost time circulating 30 minutes each	12.50
Cost time coring (at 4 ft. per hr.), 30 ft.	93.75
Cost core bit	60.00
Total cost coring	$203.75

In other words the cost is very nearly equal for the operator to obtain an electrical log or to see a core. If the operator wants to have the core analyzed the cost of analyzing depends to a great extent upon the economy. In addition there may be service and mileage charges. Possibly a waiting charge may be made which can under some circumstances greatly affect the small cost.

Original Cost Considered

However, to consider only the original costs of the two services, the economy of electrical logging easily is apparent if the operator will learn to use the logs as he has used cores in the past. Even this is usually unnecessary as the engineer making the survey is trained to interpret the log and must naturally have the interest of the operator at heart. In addition, there is a permanent record of the well as opposed to fragmentarily written notes or vague memory. However, as previously stated, this is not a comparison of values but of costs.

In deeper wells, relative costs of electrical logging and coring could easily present an entirely different picture. These could vary greatly, either in favor of the former method or the latter, depending on many factors or circumstances.

Coring in deep wells now is done almost exclusively by wire-line core barrels, which eliminate the necessity of making a trip with the pipe. In this way, substantial savings are made in time and cost of taking cores. Were it not for the use of the wire-line method, the cost of taking cores in the very deep wells might not be justified in many cases.

Amount of Coring Reduced

Within recent years the trend has been toward a reduction in the amount of coring in a well. In wildcats a considerable amount of coring sometimes still is considered essential, but in wells in proven areas as formation conditions become known coring generally is limited to a relatively few contact points. In this way total coring costs per well are cut materially.

Electrical logging is being relied upon to an increasing extent, but coring retains a definite place in modern oil-well drilling. In current operations, it is considered good practice, however, to take advantage of both methods. Some operators utilize not only these methods but also other well-logging practices, one procedure serving as a check against another. In such cases, electrical logging may be relied upon specifically for correlation work while coring may provide datum on specific contact points.

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Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 42

OCTOBER 5, 1942

FLOW OF STEAM IN PIPES

IT is important that the steam lines from the boilers to a rig be of proper size. If they are too small the steam cylinders of the engine and pumps do not receive steam at proper pressure and in adequate volume because of the friction in the line. If they are too large, there is undue loss of heat by radiation, with consequent pressure loss, condensation, and waste of heat energy.

There are several formulas which have been advanced for use in calculations concerning the flow of steam in pipes. Possibly, the most generally accepted of these formulas is a modification of the Unwin formula as follows:*

$$p = 0.000181\left(1 + \frac{36}{d_1}\right)\frac{w^2 L}{D d_1^5} \qquad (1)$$

or,

$$w = 87\left[\frac{p D d_1^5}{\left(1 + \frac{3.6}{d_1}\right) L}\right]^{1/2} \qquad (2)$$

where

w = weight of steam flowing, lb. per min.
p = difference in pressure between the two ends of the pipe, lb. per sq. in.
D = density of steam, lb. per cu. ft. (average between density at high-pressure end and density at low-pressure end of line)
d_1 = internal diameter of pipe, in.
L = length of pipe, ft.

Table 1 is calculated using Equation (2) and gives the amount of steam, in pounds, that will flow through straight smooth pipes having a length of 240 diameters from various initial pressures when the pressure drop is 1 lb. per sq. in.

For calculations involving lengths of pipe and pressure drops other than those on which the table is based the following equations may be applied:

1. To calculate the drop in pressure for any length of pipe, if the rate of flow of the steam is the same as given in the table, use the equation,

$$l = \frac{L}{240d} \qquad (3)$$

2. To calculate the rate of flow of the steam in pounds per minute, for any pressure drop, when the pipe length is the same as that used in the table, use the equation,

$$Q_1 = Q l^{1/2} \qquad (4)$$

3. To calculate the rate of flow of steam, in pounds per minute, for any pressure drop and any pipe length, use the equation,

$$Q_1 = Q\left(\frac{240\,dl}{L}\right)^{1/2} \qquad (5)$$

In Equations (3), (4), and (5),

l = pressure drop, lb. per sq. in.
L = length of pipe, in.
d = diameter of pipe, in.
Q = flow rate of steam, lb. per min., based on conditions used in Table 1
Q_1 = flow rate of steam for any actual set of conditions other than those on which Table 1 is based, lb. per min.

Elbows, globe valves, and a square-ended entrance to a pipe offer additional frictional resistance to flow of steam. For ordinary purposes the resistance of these fittings may be considered as equivalent to a certain length of straight pipe as follows:

Right-angle tee	= 80 diameters
Right-angle elbow	= 40 diameters
Square-ended entrance	= 60 diameters
Globe valve (open)	= 60 diameters

Example 1.
Problem:

A 4-in. steam line (4.026-in. i.d.) from a boiler is 250 ft. long. It contains four 90° elbows, one globe valve, and has a square-ended entrance. The steam pressure at the boiler is 220 lb. per sq. in., gage. What pressure drop would occur in the line when delivering steam at the rate of 164 lb. per minute?

Solution:

Considering losses due to entry and fittings, the equivalent length of the line would be:

$$250 + \frac{(4 \times 40 + 60 + 60)\,4.026}{12}$$

$$= 250 + 60.4 = 310.4 \text{ ft.}$$

Or,

$$L = 310.4 \times 12 = 3{,}725 \text{ in.}$$

Since the rate of flow of 164 lb. per minute agrees with that given in the table for an initial pressure of 220 lb. per sq. in. and a 4-in. line, Equation 3, may be applied.

$$l = \frac{3{,}725}{240 \times 4.026} = 3.85 \text{ lb. per sq. in.}$$

Example 2.
Problem:

With an input steam pressure of 240 lb. per sq. in. gage, what quantity of steam per minute can be delivered through a 120-ft. length of straight 6-in. pipe, if the pressure loss is to be restricted to 5 lb. per sq. in.?

Solution:

Since the length of the line is 240 diameters, the same as that on which Table 1 is based, Equation 4 may be used.

From Table 1, $Q = 439$, so,

$$Q_1 = 439 \times 5^{1/2} = 439 + 2.236 = 982 \text{ lb. per min.}$$

Example 3.
Problem:

What maximum rate of steam flow can be expected through a 300-ft. section of 3-in. line (3.068-in. i.d.) if the pressure drop is not to exceed 10 lb. per sq. in., and the input pressure is 300 lb. per sq. in., gage? (The length of 300 ft. includes equivalent losses due to entry and fittings.)

Solution:

From Table 1, $Q = 102$.

Using Equation 5,

$$Q_1 = 102\left(\frac{240 \times 3.068 \times 10}{300 \times 12}\right)^{1/2}$$

$$= 102\,(2.045)^{1/2} = 102 \times 1.43$$

$$= 146 \text{ lb. per min.}$$

TABLE 1—FLOW OF STEAM IN PIPES

Length of pipe = 240 diameters

Initial gage pressure, lb. per sq. in.—	Internal diameter of pipe, inches: 2.067	2.469	3.068	4.026	5.047	6.065
	Flow rate of steam, lb. per min. for pressure drop of 1 lb. per sq. in.					
100	25.4	38.3	62.8	115	191	287
120	27.4	41.3	67.9	125	207	310
140	29.5	43.8	72.7	134	221	332
160	31.4	46.4	77.1	142	234	351
180	33.0	48.9	81.2	150	247	370
200	34.3	51.5	84.8	156	258	387
220	36.1	53.5	88.8	164	270	405
240	37.6	55.7	92.6	171	282	422
260	39.1	57.9	96.1	177	293	439
280	40.4	59.8	99.4	183	303	454
300	41.7	61.7	102	189	312	467
320	43.0	63.7	106	195	322	483
340	44.3	65.6	109	201	331	497
360	45.5	67.3	112	206	341	510

*"Steam—Its Generation and Use," Babcock and Wilcox, 1930.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 43

OCTOBER 8, 1942

SIMPLE STEAM ENGINE PRINCIPLES

THE steam engine is designed to convert heat energy, received from steam, into mechanical work. The mechanical work is transmitted from the steam engine to perform useful tasks by means of belts, ropes, chains, gears, or other forms of power-transmitting devices.

The more important features of the steam engine are shown in the figure. The valve *A*, operated by a connection to an eccentric *B*, opens passages through which steam, supplied by a line from the boiler, may enter the cylinder *C*. The valve *A* also opens passages through which exhaust steam may flow out of the cylinder. At the position shown in the figure, steam is entering the crank end of the cylinder (right-hand side) while at the same time steam is allowed to escape from the head end (at left). The close-fitting piston *D* is moved to the left by the pressure of the steam acting against it on the right-hand side. The valve eccentric *B* is set so that after the piston has traveled to the left as far as the connecting rod and crankshaft will permit, the valve will be moved to the right (position shown with dotted lines in sketch) admitting fresh steam to the head end of the cylinder through port *E* and exhausting steam from the crank end of the cylinder through port *F*. Therefore, the pressure of the fresh steam will force the piston back to right as far as the crankshaft and connecting rod will permit. The eccentric *B* on the revolving shaft then changes the valve setting again and the same series of events is repeated.

The flywheel is provided to smooth out the operation of the engine by furnishing momentum to maintain rotation during the part of each stroke that the steam supply is cut off from both ends of the cylinder.

The reciprocating motion of the piston is transmitted through the piston rod and connecting rod to the crankshaft, imparting rotary motion to it even against considerable resistance that may be offered by a pulley and belt or other type of load rigidly attached to the crankshaft. The belt or other similar attachment may drive a drilling rig, operate an electric generator, or perform some other useful operation.

A steam engine does its work because of the heat energy which it abstracts from the steam and converts into mechanical energy. It has been proven by experiment that when heat energy is converted into mechanical energy, an exact mathematical relationship exists. The relationship is 1 B.t.u. of heat is equivalent to 778 ft.-lb. of mechanical energy.

In some calculations involving steam engines it is useful to determine by test the amount of energy taken out of the steam by the engine. The loss of heat by the steam passing through the cylinder is evidenced by a decrease in steam temperature and quality.* An actual test of steam temperature (or pressure) and quality of the steam entering the cylinder and of the exhaust steam leaving the cylinder will give sufficient data that the energy taken from the steam by the engine may be calculated using steam tables. This type of calculation is illustrated in Example 1.

All of the heat taken from steam in an engine cylinder is not converted into work; part of the heat is lost by conduction through the cylinder walls and piston. This is often termed a thermal loss.

Even all of the work done by the steam upon the piston does not represent useful work of the steam engine. This is because some of the energy imparted to the piston is dissipated by the friction of the moving parts of the engine and is thus not transmitted to some other machine. Since every mechanism has some friction, this loss is always present and may be termed the mechanical loss. A further discussion of this loss will be given later in this series in connection with a discussion of indicated horsepower, brake horsepower, friction horsepower, and mechanical efficiency.

*The term "quality" was defined in Installment 30 of this series.

Example 1.

Problem.—The steam entering an engine was found, by test, to be at a temperature of 385° F. and to have a quality of 98 per cent. The exhaust steam from the engine was at a temperature of 140° F. and had a quality of 75 per cent.

Calculate.—(1) The heat energy taken from each pound of steam in the engine cylinder, B.t.u.

2. Mechanical energy equivalent to the heat taken from each pound of steam, ft.-lb.

Solution.—(1) From the steam tables (Table 1 of Installment 31) the heat of the liquid at 385° F. is 358.8 B.t.u. per lb. The heat of evaporation at this temperature is 840.4 B.t.u. per lb.

Applying the equation given in Installment 30, the enthalpy of 1 lb. of entering steam as given is:

$$h_g = 358.8 + 0.98 \times 840.4$$
$$= 1{,}182.4 \text{ B.t.u. per lb.}$$

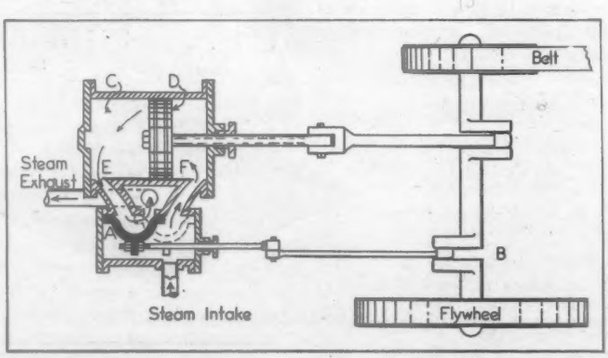
The heat of the liquid of steam at 140° F. is 107.88, and the heat of evaporation at 140° F. is 1,013.7.

So, for the exhaust steam,

$$h_g = 107.88 + 0.75 \times 1{,}013.7$$
$$= 868.1 \text{ B.t.u. per lb.}$$

Then the amount of heat abstracted from 1 lb. of steam in the engine is 1,182.4 — 868.1, or 314.3 B.t.u. per lb.

2. The heat abstracted is equivalent to 314.3 × 778, or 244,525 ft.-lb. of energy.



Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

REFINERY ACTIVITY AND EXPANSION

Noncritical Materials Used in Producing Two New Packages for Petroleum Products

REFINERS, marketers and compounders are manifesting much interest in a new 1-qt. container to replace the conventional tin can that has been in use for a number of years and a 55-gal. oil drum to take the place of the customary steel barrel. Interest in both new containers is heightened because use of tin cans was prohibited, effective September 30, by an order of WPB and steel drums are no longer replaceable.

The quart container and the barrel, which can be made in a variety of other sizes, are past the experimental stage. Both containers have undergone transportation tests by rail and truck.

The quart container was perfected by A. A. Robbins, a Los Angeles chemist, and Macmillan Petroleum Corp. after a research program extending over several years. The larger container has been developed by the W. & S. Products Co., Los Angeles, of which Philip L. Wilson is manager.

No critical materials are required in the fabrication of the quart container which is designated as a three-ply fiber can. It is spirally wrapped on a motor-driven machine and each spiral is sealed with a plastic that gives strength and renders the container leakproof. Corn, flaxseed and other grains and farm products are used along with tallow, animal tissue, bones and clay to produce a plastic material. The compound is heat treated under high pressure to form three different plastics which are then applied to the three-ply spirally wound paper containers. The three plastic compounds are impervious to oil. One is an adhesive used to bind together the three-ply paper and to cement tops and bottoms to the cylinder walls. Another is to fix the labels to the container exteriors and the third, which is regarded as the most important, is used to coat the interiors of the containers. This is a tough and elastic synthetic plastic which prevents leakage of oil even when the containers are subjected to rough handling or to wide temperature ranges. Macmillan's present lubricating-oil packaging program calls for 1 dozen 1-qt. cans to the case. The 12-qt. carton weighs about 25 lb.

The larger container, which is constructed of noncritical materials, is lined with a plastic filler that is not soluble in petroleum products.

The 55-gal. barrel contains only about 5 per cent metal in the over-all weight of the barrel. It is internally constructed so as to withstand the 4-ft. drop test necessary to meet the standard for the 55-gal. steel container. The weight of this newly developed barrel is less than 70 lb. and compares favorably with the weight of the conventional steel drum. This barrel is so constructed that there is an effective seal around all the edges which could be termed a triple seal in that it would be necessary for any fluid to penetrate three separate and distinct parts of the barrel that are locked together. Diameter of the new paper-plastic barrel is about that of the steel drum.

The barrel is 37½ in. high by 23¼ in. wide and has a reinforced wall thickness of 1½ in. In accordance with new standards one ¾-in. threaded I.P.S. and one 2-in. threaded I.P.S. are located in the top of the barrel head. These semiplastic barrels are now in use in military camps, defense plants and other services. Three California refiners are completing 90-day laboratory tests and the new plastic drums are being used for lubricating-oil shipments in Pacific Coast territory. A total of 550 are now in service in the petroleum industry. The sealing material is not a true thermoplastic, but is a combination of plastics from a cellulose base.

Shell Chemical Co. has done considerable work and appears to have discovered and developed a plastic coating for metal that will permit the use of other available materials. This plastic coating has been found to withstand heat of over 500° F., which is considerably higher than that required for the preservation of food.

Standard Oil Co. began experimenting several months ago with thermoplastics, wood, fiber and paper. Shipment of steel barrels to the armed forces in foreign countries will continue to reduce the number of available containers and hence the importance of developing suitable substitutes is urgent.

●

Furfural Capacity Will Be Tripled in Butadiene Plan

Capacity for the production of furfural is to be tripled as one phase of the synthetic-rubber program. To this end, the Office of Price Administration last week removed price ceilings from agricultural components of furfural which, before the war, was used most extensively in the oil industry as a solvent for refining lubricating oils.

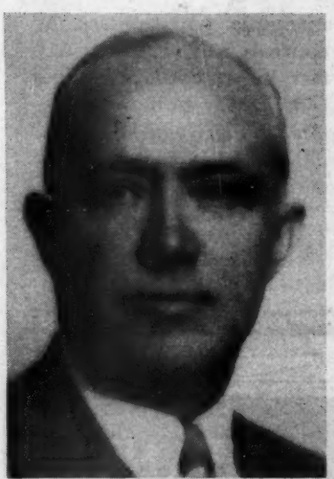
A new government plant for production of furfural is being constructed in the South, where it is favorably located because the principal raw materials, including cottonseed hulls and cottonseed-hull bran, are produced in quantity nearby.

Synthetic-Rubber Plant May Be Built in Rumania

Rumania may have a synthetic plant which will produce 3,000 tons of buna rubber annually, if present plans can be effected. The report is carried by the European press.

Plans for the rubber plant are being negotiated between an unnamed manufacturing company in Rumania and the German I. G. Farbenindustrie. The plant will produce the synthetic rubber from

Sketches of Plant Operators . . .



WILLIAM J. HALEY, new head of Standard Oil Co. (New Jersey) foreign refining operations, joined the general engineering department of the Bayway refinery as a temporary draftsman 28 years ago. Today, so far as he knows, he is still on the temporary pay roll and comments with a grin, "I'm probably just an example of Jersey's conservative policy. They want to make sure I'll fill the bill."

Successor to George W. Gordon, who recently retired as active director of the foreign refining department, Mr. Haley heads a group operating a number of refineries, including the world's largest and smallest. Regardless of their size, all of these units are vital to the Allied Nations' war effort. In normal times Mr. Haley would be concerned with some 22 refineries scattered all over the world. Numerically speaking, the Axis Powers have simplified his job a bit by taking over most of those units in Europe and in the Far East which have not been destroyed. But the increased operations of those units in the Western Hemisphere keep Mr. Haley on the job.

A native Philadelphian and graduate of the University of Pennsylvania, Mr. Haley joined the Jersey company at Bayway in July 1914. For 3 years he worked as a coal passer and field engineer in charge of pressure-still construction. Soon after the United States entered World War I he was commissioned in the Naval Reserve and ordered to Annapolis for postgraduate work. A commission in the regular Navy followed, plus active duty on destroyers and battleships. Lieutenant Haley was on one of the warships which convoyed President Wilson back from the peace conference.

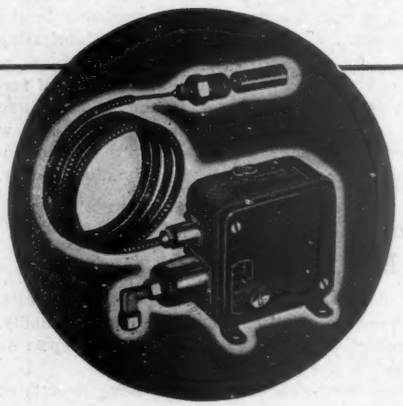
In July 1919, Mr. Haley rejoined the company at the Baton Rouge, La., refinery as mechanical superintendent, serving under George Gordon, who was then general superintendent. When the latter moved to New York in 1921 Mr. Haley became assistant general superintendent at Baton Rouge and in July of the same year transferred to the Charleston, W. Va., plant as general superintendent.

In November 1927, he went to Havana, Cuba, as manager of the Belot refinery, returning to New York 2 years later as assistant general manager of the South American plants. In June 1935, as assistant to Mr. Gordon, his duties were extended to cover European refineries as well.

Mr. Haley now lives in Bronxville, N. Y. He is married and has three children. His eldest daughter is married to a lieutenant in the U. S. Navy. The older boy is scheduled to enter the University of Pennsylvania this fall. Despite the press of business and the tire and gasoline restrictions, Mr. Haley manages to keep his golf clubs in working order. Questioned about his ability on the course, he hedges a bit. With a wry face he told the reporter—"Call it the usual business man's game."

It Costs So Little

to "KEEP 'EM RUNNING"



● Never before has it been so important to keep your internal combustion engines running . . . to avoid breakdowns, with their attendant call for critical materials and their loss of time which never can be regained.

Penn Automatic Safety Controls provide simple, *low-cost* protection against common causes of engine breakdowns. Easily installed on any engine—gas, gasoline or Diesel—these automatic "sentries" sound a warning alarm if the oil pressure drops dangerously low or if the cooling water becomes overheated. If desired they will automatically shut down the engine operation before any damage results.

Penn engine safety controls give dependable advance notice of impending trouble so that the fault can be remedied to prevent serious damage. They conserve the engine attendant's time . . . release "man hours" for other vital tasks. They can be installed on old or new engines. *And the cost is amazingly low compared with the protection they provide.*

The more engines you operate the more Penn controls can save for you. Get all the facts now, without obligation to you—write for bulletin E-100. *Penn Electric Switch Co., Goshen, Indiana.*

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natural gas, produced in moderate amounts in Rumania.

Two Domestic Refineries To Be Shipped to Russia

Arrangements for dismantlement of two domestic refineries for shipment to Soviet Russia as the nucleus for an aviation-gasoline plant in the interior of that country were announced in Washington, D. C., last week. The material salvaged from the two dismantled plants will be augmented by substantial quantities of new facilities and supplies.

Secretary of the Treasury Morgenthau announced a letter of intent had been issued to the engineers who will handle the project. The letter was signed, Mr. Morgenthau said, after he had received a message from Petroleum Coordinator Harold L. Ickes concurring in the plans previously made by the Treasury and the Lend-Lease Administration.

The equipment will be shipped to an undesignated place in Russia and erected there for the earliest possible start of production. Most details of the negotiations were concealed for military and diplomatic reasons. Secretary Morgenthau indicated that the plans contemplate a large refinery.

Washington dispatches reported that the two domestic refineries involved in the negotiations with Russia are now located at Tyler and Longview, Tex.

British-American Completing New Aviation-Gasoline Unit

TORONTO, Ont. — British-American Oil Co. is completing a large new refining unit at Clarkson, near Toronto, for the production of aviation gasoline and lubricants. On September 29 the tanker Britamolene unloaded the first cargo, of more than 20,000 bbl. of crude, from Toledo, Ohio. Crude will be stored till the refinery starts operations.

While present shipments of crude are from Great Lakes sources, docks at the plant are capable of handling ocean-going tankers. In addition to its new plant, the British-American Oil Co. is installing equipment at other refineries for the production of aviation gasoline and other war petroleum products.

Ernie Green Leaves OPC Refining Division Post

WASHINGTON, D. C.—Ernest J. Green has resigned as administrative assistant in the Refining Division of the Office of Petroleum Coordinator to become assistant to the president of the Filtrol Corp., Los Angeles, Calif. Formerly with the Department of Justice, Mr. Green was brought into the Refining Division when its was organized by Wright W. Gary, who recently resigned as OPC director of refining to become president of the Filtrol Corp.

Trial of Chemical-Antitrust Case Postponed Until War Ends

WASHINGTON, D. C.—Postponement of prosecution of 21 chemical companies and 65 of their officials on charges of violating antitrust laws until after conclusion of the war was announced here last week by Francis Biddle, attorney general. Delay of the litigation was ordered after this action had been requested by Acting Secretary of War Patterson and Acting Secretary of the Navy Forrestal.

Messrs. Patterson and Forrestal, in letters to

Mr. Biddle, declared that, in their opinions, the trial of these cases at this time would seriously impair the war effort.

Charges against the companies and individuals were contained in six separate indictments returned by a federal grand jury at South Bend, Ind., June 26, 1942, alleging illegal restraints of trade in the manufacture and sale of sulfuric acid, formic acid, oxalic acid, chromic acid, muriatic acid and bichromates of soda and potash.

Synthetic Rubber From Dairy Byproducts Investigated

WASHINGTON, D. C.—Development of a rubberlike substance from byproducts of dairy processors, reported here last week as having some possibility of commercial success, was declared by William M. Jeffers, director of the federal rubber program, to be "still in the test-tube stage."

The B. F. Goodrich Co. has carried on developmental work with the process looking toward practical utilization of the product.

"At present," declared Mr. Jeffers, "the process is still in the test-tube stage. Experiments carried out this far give some reason to hope that material suitable for recapping tires might eventually be developed in this manner. It must be emphasized, however, that the entire process is still in the experimental stage and that even if present possibilities are fully realized any substantial production is some time in the future.

"The War Production Board has expressed interest in the process. The National Dairy Products Corp. is building a pilot plant with its own funds. No estimate of the final uses of this project, or of the tonnage which might possibly be produced, can be made until these steps have been taken.

"This project offers no immediate relief as a rubber substitute. Its potential promise is of value in connection with the long-range program."

●

OPC Supports Fight for Higher Wyoming Oil Price

DENVER, Colo.—Producers in the Rocky Mountain area last week received telegrams from Washington declaring that OPC would join in the fight for higher ceiling prices for crude in this territory, particularly for Wyoming black oil. A letter from Ralph K. Davies, deputy coordinator, to Sen. Joseph C. O'Mahoney, of Wyoming, said in part:

"This office will join you in recommending prompt action by the Office of Price Administration in readjusting the price schedules of Wyoming heavy oil, which were at depressed levels 15 months ago. . . . Production of crude in the Rocky Mountain states, especially the black oil of Wyoming, should be stimulated. This will require establishment of adequate prices and the readjustment of transportation facilities. . . . Schedules established 15 months ago are unrealistic under present conditions."

Tar Coatings on Cast Iron Soil Pipe Prohibited by WPB

Use of tar coatings on cast-iron soil pipe was prohibited September 24 by the War Production Board.

The action was taken in an amendment to Schedule 4, as amended, to Limitation Order L-42.

It is estimated that 150 tank cars and box cars required for transportation of the tar will be made available for other purposes. Also, over 600 carloads of fuel in the form of coke, coke breeze, coal and oil required to heat the pipe and fittings will no longer be necessary.

FIRE and how to fight it!

EXTINGUISHERS

Is your fire-fighting equipment in good condition—ready for a sudden emergency? Even the finest portable extinguishers cannot retain full effectiveness indefinitely. Some day one of your extinguishers may be called on to save your plant. Insure reliability of your fire-fighting equipment. Follow the simple rules charted below.

		WILL IT FREEZE?
CARBON DIOXIDE	DO THIS ONCE EACH YEAR Weigh to detect leakage. If extinguisher shows loss of weight of less than 10% of rated capacity, stamped on label, nothing need be done. Recharge if weight loss shows greater than 10%.	no
SODA ACID	DO THIS ONCE EACH YEAR Discharge and refill. Mix soda solution outside extinguisher, following manufacturer's instructions. Use lukewarm, not hot water. Wash all parts with water. Examine for clogging or corrosion.	yes Do not keep outdoors in cold weather.
PLAIN WATER	DO THIS ONCE EACH YEAR Inspect by removing and weighing carbon dioxide cartridge. Replace cartridge if weight loss exceeds ½ ounce. Inspect hose and nozzle for clogging or corrosion, and check the quantity of water.	See label for this information.
FOAM	DO THIS ONCE EACH YEAR Recharge. Mix solution outside the extinguisher according to manufacturer's exact directions. Wash all parts thoroughly with water. Test hose. Examine for corrosion or clogging.	yes Do not keep outdoors in cold.
VAPORIZING LIQUID	DO THIS ONCE EACH YEAR Test by partially discharging. Pump a few strokes with extinguisher first aimed upward and then downward. Replace lost liquid, as furnished by manufacturer.	no
DRY COMPOUND	DO THIS ONCE EACH YEAR Remove and weigh carbon dioxide cartridge. Replace if it shows loss of weight of more than ½ oz. for 12 lb. extinguisher or 1 oz. for the 20 lb. size. Check quantity of dry compound and determine that it is free-flowing.	no
CARBON DIOXIDE SYSTEM	DO THIS ONCE EACH YEAR Weigh cylinders to check loss of contents. Blow out carbon dioxide lines. Check all releases, thermostats, tubing, switches, pull boxes and electric lines.	no

MORE EFFECTIVE FIRE FIGHTING

Since December 1941 Walter Kidde and Company has had an unusual war job . . . to make products that save fighting men's lives. These products include high pressure containers for aviation use, special type built-in extinguishing systems, crash trucks and various flotation equipment.

Since we have fewer Kidde extinguishers* to sell, we are trying to make your existing fire-fighting units more effective.

If you want reprints of this series of advertisements, just write to

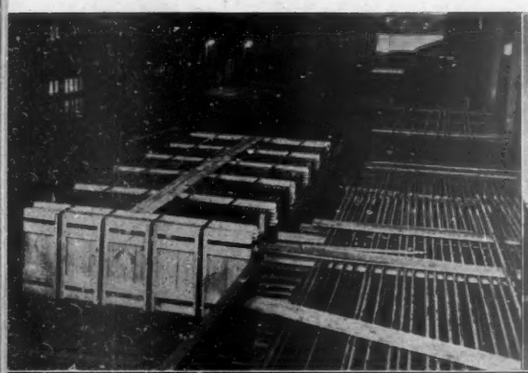
Walter Kidde & Company, Inc., 1034 West St., Bloomfield, N. J.

Kidde

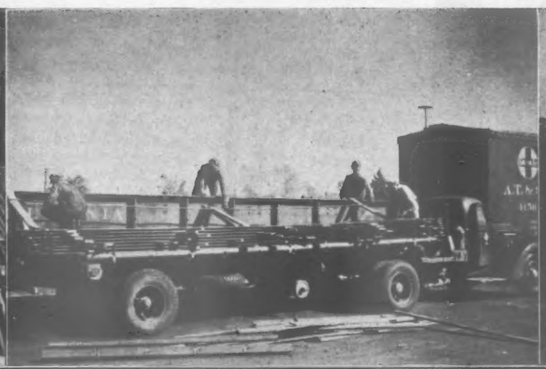
*Formerly known as "LUX" extinguishers

NOTE: Recharge extinguishers immediately after use, even though only partially expended.

We asked our *Field Engineers:*



Bulkhead Packing Keeps Them Straight from Factory to Field.

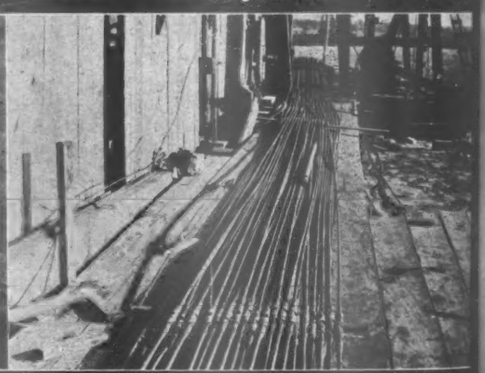


Float Trailer Transportation Keeps Them Straight from Freight Car to Destination.

Ample Skids Properly Spaced Keep Them Straight in Stock.

Careful Racking Keeps Them Straight in Storage.

Don't Drag Boxes and Pins Through Dirt.



Derrick Rod Hangers Would Have Kept Them Straight

Clean Lubricated Joints Save Make-up Time.

National Sucker Rod Snap Wrenches Assure Proper Joint Setup and Prevent Distortion of Rod Wrench Squares.

Pipe Wrenches Are Destructive to Rods and Coupling

"WHAT CAN OUR CUSTOMERS DO TO PROLONG THE LIFE OF THEIR NATIONAL SUCKER RODS?"

We asked them this question that you might profit from their extensive experience with the diversified pumping problems encountered throughout the oil fields of the world, during this period of acute raw material shortages and converted manufacturing facilities.

. . . *and here are their Recommendations:*

1 Keep sucker rods straight. National delivers straight rods at considerable expense, and every effort should be made to keep them straight.

2 Sucker rods should be hauled only on a float and not on a pole trailer to prevent bending and kinking.

3 Ample level skids (at least four) should be provided to assure straightness for rods in warehouse stocks and for surplus rods at the wells.

4 Rods should be racked so that box and coupling ends are even and enough space left between the rods to permit proper spraying.

5 Boxes and pins must not be dragged through dirt when pulling into derrick. Boxes and pins should also be well lubricated and protected from weather.

6 Rod hangers should be used in handling rods in derrick. If derrick is not up, rods should be handled in singles.

7 A clean joint is always easier to make-up and should therefore be inspected and cleaned each time the string is rerun.

8 Make up rods tight with snap wrenches. Care should be exercised to see that only wrenches of proper size are used on the wrench squares.

9 Do not use pipe wrenches on body of rods or couplings. Pipe wrench scars on body of rod and coupling form points of concentration for fatigue, strains and corrosion.

10 When a joint is hard to make-up, do not force. Break-out and use a tap or die. Avoid unnecessary hammering of joints. Do not hammer hardened and ground couplings.

11 Rods should be run without slack so that threads will not become crossed.

12 Be sure that the proper size and grade of rod is being used on each individual well and operate the well within the limitation of the rod specifications.

Discarded and worn out sucker rods are high grade scrap which is so urgently needed to make steel for armaments.

Throw Your Scrap into the Fight! ***Don't let it lay around your property. Start it on its way by turning it over to a licensed junk dealer.***

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This pioneer line of trenchers has kept a jump ahead of pipe-liner's needs. Buckeye Mainliners get down the big pipes faster; keep ahead of layers and welders. Models 32 and 48 for main lines; Models 11 and 12 for small lines.

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio
Built by Buckeye

TRENCHERS, SHOVELS, CRANES
BACKFILLERS, TRACTOR EQUIPMENT

Pipe-Line Activity

Parten Urges Line From Corpus Christi to Houston

J. R. Parten, director of transportation, Office of Petroleum Coordinator, advised the transportation committee of District 3, by telegram, that a plan for converting a large gas line from Corpus Christi to Houston, Tex., to handle crude petroleum and products should be developed and submitted at the earliest possible date, according to statement by J. A. Neath, chairman of a subcommittee appointed to study this project. Mr. Parten advises that the conversion of such a gas line should not await a decision on the crude and products to be handled through the 24-in. War Emergency line from East Texas to Illinois, since the line from Corpus Christi to Houston will probably be needed in any case.

The subcommittee has been studying this project for several weeks and has already submitted a preliminary report, indicating two alternatives for handling 50,000 to 75,000 bbl. per day of crude and products from Corpus Christi to the Houston area. Mr. Neath states that in order to facilitate successful conduct of these studies and formulation of definite plans, the transportation committee of District 3 has submitted a recommendation to the OPC which provides for the appointment of a temporary pipe-line management subcommittee and a temporary pipe-line engineering subcommittee for District 3 to handle this and other projects related to supply for the War Emergency line from East Texas.

Arrangements Proceed for Tiffin-Akron Pipe Line

Construction of a new 8-in. gasoline pipe line which will link a number of midwestern refineries direct with the eastern seaboard is to be started within the next few weeks, according to Sidney A. Swensrud, vice president of the Standard Oil Co. of Ohio and president of the Ohio Emergency Pipelines, Inc., which will build the line for Defense Plant Corp.

Acquisition of right-of-way for this 82-mile line from Tiffin to Doylestown, south of Akron, Ohio, is almost complete, according to Mr. Swensrud, who stated that contracts for construction of the line and three pumping stations are to be awarded soon. Second-hand pipe from West Texas is scheduled for use in this new line, which will receive gasoline from Toledo and Lima, Ohio, Chicago and Wood River, Ill., and other refinery centers through existing gasoline lines coming into western Ohio. It will move gasoline eastward for delivery to the Sun Oil Line Co.'s existing line at a point east of Akron.

B. K. Morse of Philadelphia, chief engineer of Sun Oil Line Co. who is on leave to serve as chief engineer for the emergency line, has established project offices at Mansfield, Ohio.

N. J. McGaw, vice president of Shell Oil Co., Inc., New York City, and Frank L. Hadley, vice president of the Sun Oil Line Co., Philadelphia, Pa., serve with Mr. Swensrud as directors of Ohio Emergency Pipelines, Inc., which is a joint enterprise with backing of their respective companies. They have pooled manpower and facilities in the interest of solving the critical need for more adequate year-round transportation facilities to move gasoline to the Atlantic seaboard.

The new line will handle 15,000 bbl. per day direct from the refineries, so that the existing Sun Oil line eastbound from Randolph station (east of Akron) will not be dependent upon seasonal deliveries via Lake tankers, which have supplied this line since it was pressed into service to meet critical shortages in the East several months ago. This line was originally built to deliver gasoline to Cleveland from eastern refineries but was reversed to meet the shifting need.

The DPC project includes one pumping station to be constructed near Willard, Ohio. Standard Oil Co. (Ohio) will construct two additional pumping stations, one at Fostoria and one at Clinton, south of Barberton, Ohio, as well as a 26-mile connecting line southwest from the Sun Oil line at Randolph station to the DPC line. This undertaking was formerly designated as the Fostoria-Akron line of Project 3 of the OPC pipe-line program.

Eastern Natural Shortage Spurs Gas Pipe-Line Plans

L. L. Tonkin, president of the Hope Natural Gas Co. of West Virginia, testified at a Securities and Exchange Commission hearing that there is a possibility the company might be ordered to supply natural gas to other systems "if it is permitted to build its proposed $42,000,000 pipe line from Louisiana and Texas to the Appalachian area."

Mr. Tonkin said it would first extend to the Monroe field in Louisiana, but added: "If we stop at Louisiana, within 2 years we would of a necessity have to go to Texas."

The SEC hearing is on an application by the Consolidated Gas Co., a new Standard Oil Co. (New Jersey) subsidiary, to acquire stocks of Hope and three other Standard utility affiliates in exchange for its own capital securities. The three other utilities are East Ohio Gas Co., Peoples Natural Gas Co. in Pennsylvania and River Gas Co. in Ohio.

SEC Approves New Control Of Panhandle Eastern

The long fight between Columbia Oil & Gasoline Corp. and Missouri-Kansas Pipe Line Co. over control of the $75,000,000 Panhandle Eastern Pipe Line Co. virtually ended with the Securities and Exchange Commission approving transactions leading to Mokan's eventual control of the valuable natural-gas property.

Columbia Oil was given a year to consummate the voluntary $10,436,826 sale of its Panhandle holdings to the Phillips Petroleum Co. which already has said it will sell half of its interest to Mokan. All that remains is approval of Columbia Oil stockholders.

The plan also provides for the dissolution of Columbia Oil, a subsidiary of Columbia Gas & Electric Corp., and the SEC said consummation of the proposals automatically would end "death sentence" action against Columbia Oil under the holding company act. SEC last April directed the Columbia companies to cut Panhandle from the Columbia gas system.

Through the sale, Phillips will acquire 404,326, or 50.1 per cent of Panhandle Eastern common shares, and transfer 25 per cent of the shares to Mokan which then will hold almost 68 per cent.

Phillips also will deliver to Columbia Oil releases on all law suits filed by Mokan against Columbia Oil. The transaction also is expected to end the Government's antitrust action against Columbia Oil over its control of Panhandle.

Counsel for Mokan has estimated that Mo-

kan's damage suits aggregated about $7,500,000.

It is expected that W. G. Maguire, Mokan president, will become chairman and chief executive of Panhandle and that Phillips will name the new president. It also is considered likely that Phillips will place three men on the Panhandle board of directors.

The deal also involves Columbia Oil surrendering to Panhandle for retirement 10,000 shares of Panhandle Class B preferred stock in return for $1,000,000 cash.

To effect dissolution, Columbia Oil will pay its stockholders $1 for each share held in settlement of their rights; pay in full all indebtedness, including 3 and 6 per cent debentures, due 1956, now held by Columbia Gas; and transfer all remaining assets to Columbia Gas as holder of Columbia Oil's preferred stock.

The SEC's public utilities division, in recommending approval of the plan, said that a proposed gas contract between Panhandle and Phillips would serve the public and the consumer alike by increasing use of gas in the Detroit area and reducing rates. Detroit is the largest consuming area served by Panhandle.

Sinclair Gets Permit To Remove Pipe Line

Permission was granted by the Railroad Commission of Texas for Sinclair Refining Co. to remove an 8-in. oil pipe line from the Panhandle for installation in the Gulf Coast area to relieve the burden thrust on transportation facilities. Two lines, totaling about 93 miles, were involved.

Sinclair officials stated that the line is made necessary by the congested situation around Corpus Christi and Southwest Texas, where much oil is in storage and proration has cut production to a minimum.

It has not yet been decided when actual construction work will be started nor when it will be completed, neither the cost. But, officials said the work when under way will be pushed with all possible speed.

Pipe Line Is Planned From Poza Rica to Mexico City

There has been a revival of consideration of plans to lay a pipe line from Poza Rica to Mexico City entailing an expenditure of 20 million pesos. According to reports the Mexican Government has been trying to have such a project built for several years for the purpose of bringing natural gas to Mexico City.

Work Progresses on Bayou Pipe Line System

In spite of bad weather and some difficulties in obtaining the necessary supplies, work on the 250-mile line of the Bayou Pipe Line System has been progressing steadily. This line will connect refineries in the Houston-Port Arthur area with the western terminal of Plantation Pipe Line at Baton Rouge, La. Half of the 8-in. has already been laid as well as 15 per cent of the 10-in.

In addition to the letting of contracts for laying the line, contracts have been let for construction of pump stations to L. E. Myers Co. The building of eight storage tanks at Baytown and Port Neches, Tex., with capacities ranging from 37,000 to 60,000 bbl. has been contracted by Steel Construction Co. Five tanks of 20,000 to 37,000 bbl. capacity are being built by Banks Moreland Co.

Contracts for electric power for 11 stations have been let as follows: Gulf States Utilities Co., 9 stations; Gulf Public Service Co., 1 station; Houston Lighting & Power Co., 1 station.

Construction of the project for the Bayou Pipe Line System is being handled by Shell Pipe Line Corp.

Conversion of Natural Gas To Crude Service Considered

In solving the problem of increasing shipments of crude from Corpus Christi to Houston, Tex., consideration has been given to two plans. It is reported that one of these calls for conversion of a large part of the system of United Gas Pipe Line Co.

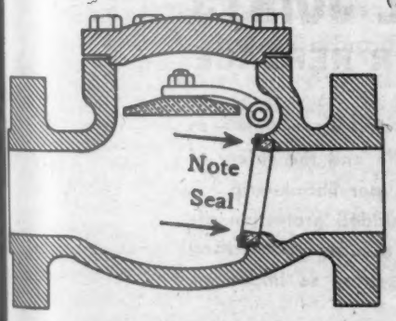
The program which Sinclair is reported to have for moving the line from Oklahoma and the Panhandle of Texas to the Corpus Christi-Houston area is said to be separate from the projects under consideration by companies which are working for the solution through the committee headed by J. A. Neath. There has been mention made of utilization of natural-gas lines in other areas for crude purposes. It has even been suggested that a natural-gas line between Kentucky and Philadelphia may be utilized in plans for extending the War Emergency pipe line eastward from Norris City, Ill.

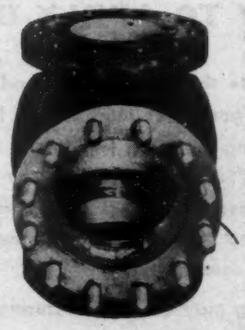
Magnolia Lays Line Between Beaumont and Port Neches

Magnolia interests have let a contract to Williams Brothers for the laying of approximately 10 miles of 8-in. pipe between the Magnolia refinery at Beaumont and Port Neches, Tex. The purpose of the line is to ship products destined for Project 5 consisting of a network of old lines and some new construction for making deliveries at Helena, Ark., on the Mississippi River.

WHEATLEY SYNTHETIC RUBBER SEAL CHECK VALVE

(FULL OPENING HORIZONTAL SWING CHECK VALVE)





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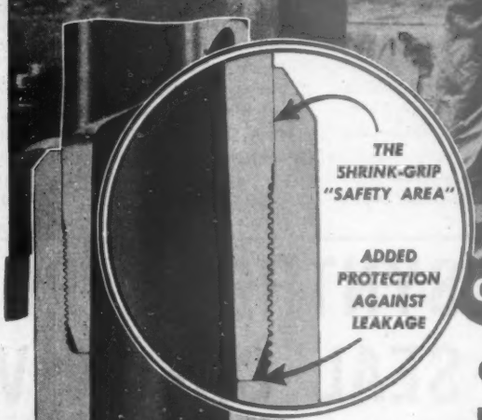

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

Developments of considerable significance are reported this week from Texas and California. The Texas discovery was a good Edwards lime well in Atascosa County far from previous Edwards production. The depth of this discovery, nearly 8,000 ft., will cause some revision of theories regarding the depths at which the lime will be found productive. The find is also important in that the test was started in the updip Wilcox sector, that is the area in which the Wilcox pinches out and where tests are rarely drilled deep into that formation.

The Edwards lime, of Lower Cretaceous age, has been the most important producer along the Balcones fault zone in the San Antonio district but played out to the southeast and northwest. One explanation of the limited extent of the productive area is the fact that commercial accumulations have been found only in those sectors where the overlying formations lie unconformably above the Edwards. If this rule holds true and the unconformity extends into Atascosa County, the whole updip Wilcox zone may have to be redrilled to this lower formation.

The California discovery opens up a new deep pay in the Newhall-Potrero area and presents interesting possibilities in a number of closely spaced pools in this sector. Unfortunately, under existing circumstances, the oil is a light crude rather than heavy, which is now in such great demand.

Hope for increased heavy crude production was stimulated by a well in the old Midway-Sunset area, which may also cause some headaches in Washington. A redrilling program was started in this area a few weeks ago and one well which was expected to be a small pumper made between 1,000 and 1,500 bbl. with enough gas to flow it. This is in an area which had been on production for more than 30 years.

Drilling of wildcats is being encouraged and new fields are badly needed. On the other hand, drilling of development wells is being retarded. There has been some tendency to favor redrilling for the installation of secondary-recovery methods but thes are obviously not needed if wells can be drilled in 30-year-old fields which will yield what amounts to flush production.

This is not a unique case. Flowing wells, although not of this magnitude, were frequently reported in the old Chelsea pool of Oklahoma when floods were being installed. Without minimizing the need for new fields, which is very great, it might be pointed out that there are many fields where proven locations could be drilled with considerable increase in available oil. This could be produced without requiring any extension to existing transportation systems. The program would, however, play hob with M-68 and might require some revision of current ideas on 40-acre spacing. Actually much of the limited production reported from oil fields was due to the production methods used and failure to keep the wells in condition. Their revival after supposed depletion may be due to a partial restoration of original conditions in the pay.

COLORADO: Further development of the dry-ice field in Jackson County is under way as means have been found of separating the carbon dioxide from the small amount of oil accompanying it. The gas is to be used in the synthetic-rubber program (p. 74).

CALIFORNIA: A new deep zone has been opened to production in the Del Valle field with a 4,000-bbl. well affording the best discovery in the coastal district in recent years. Miocene production has been extended at Cat Canyon. A good producer was brought in in the Midway-Sunset field in an area considered practically depleted (p. 72).

WEST TEXAS: The Ellenburger productive area in Andrews County was proved to be smaller than the overlying Permian field by two dry holes which have been plugged back for shallower production. The Permian area is steadily expanding (p. 70).

ALBERTA: Paced by the 500-bbl. pilot plant now in operation, activity in the Tar Sand district is accelerating. Additional exploratory drilling and a 10,000-bbl. plant are under consideration (p. 80).

TEXAS GULF COAST: Following apparent linking of the Harmon and Ganado fields in Jackson County last week, Mayo, on the same trend as Harmon and probably continuous with it, has been extended more than ½ mile to the east (p. 76).

NORTH TEXAS: Two Ellenburger lime tests in Montague County are being plugged back to test shallower shows (p. 75).

LOUISIANA GULF COAST: Deep gas production has been found at Deer Island, Terrebonne Parish. Prospective pool openers in La Fourche and Acadia parishes are indicated (p. 76).

SOUTHWEST TEXAS: Opening of Edwards lime production at Atascosa County is of major importance as a large area is opened for deep prospecting. An extensive lease play is already under way (p. 70).

MONTANA: Oil has been found in the Madison on the Twin Rivers structure northwest of Cut Bank and near the Canadian border (p. 74).

KANSAS: Silica and Chase appear to be linked by a new Arbuckle lime producer. Lindsborg is extended to the northeast (p. 82).

ILLINOIS: After an initial jump resulting from M-68-5, new operations are again declining. a new large producer adds to the importance of the new Blairsville pool in Hamilton County (p. 79).

EAST TEXAS: Cherokee County's Pettit lime discovery made a fair producer on official gage (p. 75).

OKLAHOMA: Good production is reported from an outpost well northeast of Jesse but across the county line in Coal County (p. 85).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended October 3, 1942)

	Oil	Gas	Dry	Total	Footage	Tll. comp. to date 1942	1941
N. Y., Pa., and W. Va.	41	10	6	57	110,751	2,672	4,488
Ohio	7	11	10	28	73,527	870	1,279
Indiana	1	0	7	8	16,015	269	383
Kentucky	1	1	0	2	5,380	215	501
Illinois	25	0	14	39	97,309	1,370	2,741
Michigan	8	0	9	17	37,766	554	676
Kansas	15	3	18	36	114,062	1,222	1,675
Nebraska	0	0	1	1	902	30	72
Missouri, Iowa	0	0	0	0	0	10	28
Oklahoma	10	3	10	23	73,411	933	1,450
Texas:							
North Central Texas	6	0	14	20	47,471	902	2,176
West Texas	14	0	7	21	76,714	1,076	1,719
Texas Panhandle	5	1	0	6	17,439	297	504
Eastern Texas	1	0	2	3	13,431	311	821
Texas Gulf Coast	3	0	3	6	36,632	563	834
Southwest Texas	11	0	4	15	83,290	843	1,411
Total Texas	40	1	30	71	274,977	3,992	7,465
North Louisiana	2	4	4	10	35,714	376	578
Louisiana Gulf Coast	2	0	4	6	53,544	400	667
Total Louisiana	4	4	8	16	89,258	776	1,245
Arkansas	0	0	1	1	3,505	138	142
Mississippi and Southeast	0	0	0	0	0	61	202
Montana	4	0	1	5	12,827	156	216
Wyoming	1	0	0	1	6,750	81	145
Colorado, Utah	0	0	2	2	6,940	17	25
New Mexico	5	0	0	5	16,535	209	214
California	10	0	3	13	36,760	566	851
Total United States	172	33	120	325	976,675	14,141	23,798
Total previous week	177	39	123	339			
Week ended Oct. 4, 1941	427	46	110	583			

PERMIAN BASIN, PANHANDLE

Productive Area of Ellenburger Limited in West Andrews Field

By ROBERT INGRAM

MIDLAND, Tex.—Two Ellenburger tests in the West Andrews field were dry in that deep zone last week, thus limiting the extent of the Ellenburger pay area (Embar field) to much less than the probable size of the overlying Permian lime field. Both tests were plugging back at the week's end for probable completion in the shallower horizons.

About 1 mile north of production, Stanolind 1-W University, Section 19, Block 10, University Survey, stopped drilling at 8,376 ft., still short of the Ellenburger, and was plugging back to 6,200 ft. Ellenburger production under the well was extremely unlikely in view of the depth, since the deep Ordovician lime is found at between 7,800 ft. and 8,000 ft. in producing wells in the field.

Indication of the depth of the Ellenburger here was seen the previous week in the already unusually thick Simpson section which had been logged, but operators deepened the well in search of accurate structural information. Even without a top on the Ellenburger here, however, the well pointed up sharply the usual conditions in the Permian basin where Ellenburger structures usually underly Permian highs but are much smaller in area and seldom conform. In some cases there are probably several Ellenburger highs under a single large Permian lime structure.

A similar condition was shown west of the Stanolind well at Phillips Petroleum Co. 12 University-Andrews, Section 24, Block 11, although the dip was not so pronounced. Here the Ellenburger was topped at 8,128 ft. This, too, was structurally low and a drill-stem test at 8,120-95 ft., total depth, recovered 7,100 ft. of sulfur water.

Shallow Pay Extended

While the deep zone at West Andrews was limited by the two northerly tests, the Permian pay area was apparently again extended half way to the West Fuhrman area by Mid-Continent Petroleum Co. 1 University-South, Section 16, Block 10. Pending further tests, however, the well was classed as a pool opener. It was completed to flow 121 bbl. of 32.7-gravity oil daily with gas-oil ratio of 560:1 after shots with 450 qt. and 410 qt. in the Permian lime pay at 4,507-4,618 ft., total depth. It is about 5 miles northeast of production.

Saturation in Northwest Andrews

Early in the week a show of oil was reported in a wildcat 3 miles southeast of Shafter Lake in northwestern Andrews County, the Union Oil Co. of California 1 A. C. Means, Section 23, Block A-36, P.S.L. Survey. It drilled lime showing oil from 4,403 ft. to 4,405 ft., but no free oil was found. Drilling continued below 4,548 ft. in lime with no change.

Drill-Stem Test at Gaines

Shell Oil Co., Inc. 1 Leaverton, Section 458, Block G, C.C.S.D.&R.G.N.G. Survey, Ordovician wildcat in northwestern Gaines County, 4 miles southwest of the Wasson pool, cored from 5,198 ft. to 5,218 ft. at the week's end with recovery of 20 ft. of brown lime with anhydrite inclusions. The core showed poor to good porosity and was bleeding a little in spots.

Drilling was halted and operator ran a drill-stem test at 5,098-5,218 ft. with the tool open for 1 hour. Results of the test were not announced at once.

NORTHERN WEST TEXAS COMPLETIONS

Fields

Slaughter, Hockley County: Devonian 6 Hudgens, Sec. 8, Blk. X, P.S.L. Sur., elev. 3,550 ft., flowed 1,394 bbl. through casing after acid, pay 4,987 ft., T.D. 5,033 ft.

Western States Gasoline 14-B Mallett, NE NE Lab. 20, Lge. 50, Scurry C.S.L. Sur., elev. 3,607 ft., flowed 930 bbl. through casing after acid, pay 4,980 ft., T.D. 5,038 ft.

Western States Gasoline 18-B Mallett, SE SE Lab. 1, Lge. 50, Scurry C.S.L. Sur., elev. 3,625 ft., flowed 1,060 bbl. through casing after acid, pay 4,957 ft., T.D. 5,017 ft.

Wasson, Gaines County: Amon G. Carter 2-A Langdon, NE NE Sec. 43, Blk. AX, P.S.L. Sur., elev. 3,536 ft., flowed 359 bbl. through 21/32-in. tubing choke, after acid, pay 4,885 ft., T.D. 5,000 ft.

Amon G. Carter and Phillips 4-A Wasson, NW NE Sec. 53, Blk. AX, P.S.L. Sur., elev. 3,568 ft., flowed 420 bbl. through 17/32-in. tubing choke after acid, pay 4,916 ft., T.D. 4,970 ft., P.B. 4,944 ft.

Wasson, Yoakum County: T. P. Coal & Oil 37 Bennett, NE NW Sec. 630, Blk. D, J. H. Gibson Sur., elev. 3,581 ft., flowed 622 bbl. through tubing after acid, pay 5,120 ft., T.D. 5,259 ft.

West Andrews, Andrews County: Mid-Continent 1-A University, SW NW Sec. 7, Blk. 10, Univ. Sur., elev. 3,280 ft., pumped 73 bbl. oil and 8.2 bbl. water, shot, anhydrite 1,530 ft., Yates sand 2,850 ft., Yates frosted grains 2,870 ft., brown lime 4,120 ft., pay 4,458 ft., T.D. 4,532 ft., P.B. 4,520 ft.

West Fuhrman, Andrews County: Mid-Continent 1 University, SW SW Sec. 2, Blk. 10, Univ. Sur., ¼ mi. NE of Siemoneit 1 and 1 mi. S of field, elev. 3,221 ft., flowed 121 bbl. through ¼-in. tubing choke after shot, pay 4,507 ft., T.D. 4,618 ft.

Drilling Increase Recorded in Southern Part of Permian Basin

Drilling picked up last week in the southern part of the Permian basin after reaching a low point for many months. No reason for the spurt in activity was apparent, but a score of locations were made in the district, compared with an average of less than half that many for the past weeks, and most of them were in Pecos County shallow areas. There were also a number of wildcats.

Among them was Skelly Oil Co. 1 G. T. Spears, W½ S½ Section 5, Block 3, H.&T.C. Survey, south of the Abell pool in northern Pecos County. Also, plans were near completion for an Ordovician wildcat in western Ector County to be drilled by R. A. Conklin et al. Tentative location was Section 18, Block 45, Township 1s, T.&P. Survey, probably in SW NW. This would place the well about 5 miles west of the Goldsmith area and about 4 miles northeast of Shell Oil Co. 1 Blue, Winkler County Ordovician test now drilling.

Several other Ordovician wildcats were making progress. Shell 1 Blue, Section 15, Block 45, Township 1s, T.&P. Survey, was drilling at 4,625 ft. in lime. In southeastern Crane County, Skelly 1 Richardson, Section 5, Block 31, H.&T.C. Survey, was drilling below 5,571 ft. and was reported, unofficially, to have topped the Simpson high.

(Continued on Page 82)

SOUTHWEST TEXAS

Edwards Lime Field Opened in Updip Wilcox Trend Sector

By F. L. SINGLETON

SAN ANTONIO, Tex.—The opening this week of Edwards lime production in the Imogene area, Atascosa County, marks the first important Edwards lime discovery to be made in the Balcones fault-line district, South Central Texas, since the discovery of the Darst Creek field in 1929. It is the first deep Edwards production for the district, being some 4,500 ft. deeper than any Edwards lime oil found to date and provides an incentive for deeper exploration along a northeast-southwest trend, flanking the old original Balcones fault zone area which has been confined largely to shallow development.

The discovery well, Humble 1 M. L. Thompson, was officially completed for an initial production of 123 bbl. of 38.7-gravity oil in 22 hours, flowing through a 3/16-in. choke. Tubing pressure was 350 lb., and gas-oil ratio was 926 to 1. The Edwards lime was topped at 7,573 ft., and completion was made with the hole bottomed at 7,575 ft. Five and one-half inch casing was cemented on top of the lime.

The well is located on a block of approximately 23,000 acres extending in a northeast-southwest direction for a distance of about 6 miles and from subsurface and geophysical work done in the area, it is believed that from 2,000 to 2,500 acres will prove productive with the trend of production being confined to a narrow strip which is typical of Edwards lime fields. Location for a second test has already been made and a rig is being moved in for 1 A. G. Soechting et al located on the common lines of Lots 271 and 273 in the Peter MacGreal Survey, about 1,800 ft. northeast of the discovery well.

Discovery Encourages Lease Play

Including the block on which the discovery was drilled, the Humble Co. is reported to have under lease between 60,000 and 70,000 acres located along this same trend. In addition, the discovery has set off an active leasing and royalty play along the entire trend. The heaviest buyer of acreage has been the Plymouth Oil Co. which leased 4,934 acres, 6 miles east of Pleasanton, Atascosa County. The acreage centers in the Carlos Perez Survey 1041, John Pleasants Survey 1044, I.&G.N. Survey 1044½, Gertrude Tarin Survey 1061, C. Contis Survey 1066. The consideration is unknown. Close-in royalty is reported to be selling between $200 and $300 per acre base.

The incentive for a revival of interest in Edwards lime production is well founded. While the potentiality of a structure cannot be determined by one well, the performance of the Hum-

ble producer indicates that production will be sustained and if the lime is as prolific in the downdip sector as it is in the Luling, Salt Flat and Darst Creek fields, a high per-acre recovery can be expected.

Edwards lime production in the Balcones faultline zone was opened in 1922 with the discovery of the Luling field, Caldwell County which was followed by Salt Flats, Caldwell County, in 1928 and Darst Creek in 1929. These fields are by far the most outstanding fields in the district and they have provided an incentive for a continued exploration program in the district in spite of the fact that the results have been discouraging. Production in the above-named fields range in depth from approximately 2,200 ft. to 2,700 ft., and their combined production amounts to several hundred million barrels of oil.

Since the discovery of the above fields, hundreds of Edwards lime tests have been drilled, most of which have been located in Caldwell, Guadalupe, Bexar, Medina, Bastrop, Milam and Williamson counties which comprise the major portion of the updip sector of the zone. While some additional Edwards lime production was found, the fields are insignificant when compared to the Luling-Salt Flat area, as production was usually confined to one or two wells.

Geographically, the Imogene discovery is situated about 35 miles south of San Antonio, and about 70 miles southwest of the old Luling-Salt Flat-Darst Creek area. The trend in which this new strike opens, heretofore has been referred to the up-dip sector of the Wilcox trend and during the past several months the area has received much shallow development due to such discoveries in La Salle and Wilson counties. Many of the wells abandoned here were drilled on the strength of geological surveys, and as a result they can now be reinstated as favorable structures in light of this week's discovery.

There were few other important developments in the district. In the new Gadena field, Duval County, Taylor Refining Co. 1 Garcia had apparently discovered a new sand with the recovery of pipe-line oil on a drill-stem test in 1 G. Garcia. Sand showing oil was cored at 4,551-58 ft., and on a 25-minute drill-stem test at 4,550-80 ft., 275 ft. of oil was recovered and working pressure built up to 26 lb. While opening this new sand the well also defined production in the discovery pay as drill-stem testing at 5,246-53 ft., tested no pressure and recovered salt water.

SOUTHWEST TEXAS COMPLETIONS
LOWER GULF COAST DISTRICT

Wildcats

Gonzales County: Continental 1 E. F. Burns, dry, T.D. 8,510 ft.

Fields

North Pettus, Bee County: Union Producing Co. 58 Ray, 38 bbl. distillate and 36,000,000 cu. ft. gas, 9/32-in. choke, perf. casing 6,943-63 ft., T.D. 7,010 ft.

Seeligson, Jim Wells County: Humble 4 King, 161 bbl., ½-in. choke, T.D. 5,973 ft.

Magnolia 32 Seeligson, 148 bbl., 7/64-in. choke, perf. casing 5,952-54 ft., T.D. 6,019 ft.

Shell 14 Seeligson, 149 bbl., 7/64-in. choke, perf. casing 5,992-98 ft., T.D. 6,001 ft.

Sun 6 Miller, 177 bbl., 7/64-in. choke, perf. casing 5,950-53 ft., T.D. 6,000 ft.

Stratton, Nueces County: Humble 18 King, 143 bbl., ½-in. choke, T.D. 6,612 ft.

West Tuleta, Bee County: Mills Bennett et al 1 Felipe Perez, 260 bbl. distillate and 10,000,000 cu. ft. gas open flow, perf. casing 7,590-7,600 ft., T.D. 7,790 ft.

LAREDO DISTRICT

Wildcats

Duval County: Yegua 1 Ruiz, dry, T.D. 3,675 ft.

Jim Hogg County: Sun 1-D East, temp. abandoned, T.D. 5,303 ft.

Fields

Colorado, Jim Hogg County: Humble 1-B East, 162 bbl., ½-in. choke, T.D. 3,052 ft.

North Sun, Starr County: Sun 10 Garza, 48 bbl., 8 hr., 9/64-in. choke, perf. casing 4,536-39 ft., T.D. 4,541 ft.

Sun 9 Garza, 47 bbl. oil 8 hr., 9/64-in. choke, perf. casing 4,536-40 ft., T.D. 4,541 ft.

Rincon, Starr County: Continental 4-D Slick, 178 bbl., 3/16-in. choke, perf. casing 4,014-23 ft., T.D. 4,660 ft.

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Production Opened From Deep Zone in Del Valle Field

By L. P. STOCKMAN

LOS ANGELES, Calif.—R. E. Havenstrite made a formation test of the new zone which he discovered in the Del Valle field a short time ago in 2 Barnes and the results greatly exceeded expectations. After spending several weeks attempting to make a formation test of a zone logged at 7,000-7,150 ft., Havenstrite finally gave up and proceeded to test out the new zone found in the bottom of the hole at 7,975 ft. This new deep zone was recognized several weeks ago but the operator did not know whether it would be a gas sand or a new oil zone. The question was answered late this week when on a formation test the well flowed at a daily rate of 4,000 bbl. of clean 41-gravity oil and 5,500,000 cu. ft. of gas. Packer was set at 7,900 ft. and there was no question about the well having considerable kick as it came in with a bang. It may be some time before the real significance of this new zone becomes generally appreciated but to some it is the most important discovery since Barnsdall Oil Co. stepped into the Newhall Potrero field and finished an excellent flowing well on the Rancho San Francisco lease. In the five years that have elapsed since completion of the Barnsdall discovery well at Newhall Potrero, several new fields have been discovered and progressively deeper drilling has opened up three productive zones in the Modelo of Miocene age.

Havenstrite's new deep zone presents tremendous possibilities and might very easily affect every field in the Newhall-Castaic region. Correlation work has not been completed but this new zone may be the equivalent of the deep zone found by Tide Water Associated Oil Co. several months ago in the Aliso Canyon field. If such is the case Havenstrite's new zone will be substantially below anything found to date and fields now producing from the first, second and third Modelo zones can normally be expected to find the new deep zone when and if deeper drilling is started. Tide Water Associated Oil Co. found the deep zone in the Aliso Canyon field and has two wells completed in this horizon at the present time. These wells are 12 and 26 on the Porter lease and both have shown substantial production. The lower Porter zone found by Tide Water Associated Oil Co. at Aliso Canyon is about 400 ft. thick and if Havenstrite's new zone is the equivalent of this horizon the zone at Del Valle should be prolific and possibly from 200 to 400 ft. thick. The proving up of this lower zone in the Del Valle field tends to indicate that it or its equivalents can be expected in all fields extending from Aliso Canyon on the south to Del Valle on the north.

If normal expectations prove accurate and this new zone extends over all nearby and comparable fields in the Newhall-Castaic region it will have a great affect on the proved reserves of this general area. Discovery of this deep zone together with deep discoveries of Tide Water Associated Oil Co. at Aliso Canyon and Western Gulf Oil Co. in the Oak Canyon field definitely indicate that deeper drilling is justified in several fields in this locality. There is a suspicion that Havenstrite's new zone at Del Valle is the equivalent of the deep zone found several months ago by Western Gulf Oil Co. at Oak Canyon although this will not be definitely determined until some additional drilling is undertaken. Conservatively the new Del Valle zone should add 25,000,000 bbl. to the future production of this field and if it is later found to underlie other similar fields it may increase ultimate production all the way from 50,000,000 to 250,000,000 bbl.

Productive Limits of Miocene Extended in Cat Canyon Field

Further northwest along the Coastal area, Union Oil Co. extended the productive limits of the Miocene in the Cat Canyon field of Santa Barbara County by completing 15 Bell in 35-9n-33w flowing 1,760 bbl. of 19.5-gravity oil daily through a 48/64-in. bean from the Los Flores zone at 5,122 ft. This well is located substantially higher than other completions in the Cat Canyon Miocene to date and it has 528 ft. of oil sand. The bit was still in the pay when drilling operations were concluded and therefore the entire thickness of oil sand present has not been definitely determined. Standard Oil Co. proved up the existence of Miocene production in the Cat Canyon by completing 1 Los Flores out on the west flank of the structure. Union Oil Co. which controls practically all of the Cat Canyon field has long suspected the existence of Miocene possibilities but this property was being held back for that proverbial rainy day when production might not be as plentiful as at present. Standard would also have liked to hold back its Los Flores property but found it necessary to proceed with drilling back in 1938. Development work has been kept under restraint with the result that only a few wells have been finished up to date. The net result of Standard's drilling operations on the Los Flores property has been to prove up several hundred acres for Standard Oil Co. and several thousand acres for Union Oil Co. The Los Flores and other properties being developed by Standard and Union are located in the West Cat Canyon field as differentiated from East Cat Canyon and other adjacent productive areas.

COASTAL DISTRICT COMPLETIONS

Oxnard wildcat district, Ventura County: Royalty Service Corp. 1 Leonard, 29-2n-22w, dry, T.D. 8,417 ft., no oil or gas showings logged, upper tar zone usually found in this area was absent in this hole, did not drill down to Miocene due to unfavorable outlook.

Santa Maria Cat Canyon, Santa Barbara County: Union Oil Co 15 Bell, 35-9n-33w, flowed 1,760 bbl., 19.4-gravity, 1.1 per cent cut, 600,000 cu. ft. gas, 48/64-in. bean, pressures 125/540 lb., T.D. 5,122 ft., perf. 4,592-5,120 ft., completed in Los Flores zone of Miocene age, extends Cat Canyon field 4,000 ft. southeast.

Ventura Newhall, Ventura County: Ventura Southern Oil Co. 1 McCampbell, 19-3n-19w, dry, T.D. 5,363 ft., no important oil or gas showings, Pico 1,100 ft., top Miocene 1,600 ft., Modelo zone 2,600 ft., Valvulineria 2,625 ft., Sespe zone 4,150 ft.

Army or Navy May Take Over Operation of Elk Hills Field

The appointment of William C. McDuffie as a colonel in the Army Specialist Corps and the announced intention of the Navy Department to cancel all leases in the Elk Hills field of Kern County revives the possibility that the Army or Navy will soon take over control of the entire Elk Hills structure and proceed with development work. This will mean, if true, that all properties on the structure would be condemned and actual operation taken over by some one of the armed forces. The Navy has long desired to take over actual operation of the Elk Hills Naval Reserve established over 30 years ago but this was held up for a long time pending the outcome of the celebrated Section 36 case, which the federal Government won after many years litigation. Standard Oil Co. has had no objection to the federal Government taking over the Elk Hills field but in view of the stiff judgment taken in the Section 36 case hopes to secure a fair price for its fee-owned acreage. For the past two years Standard has been drilling for the primary purpose of establishing property values so that when and if the Navy Department took possession they would have something tangible upon which to base values. As a result of this development work, Standard Oil Co. last year proved up the existence of the productive Stevens oil zone of Miocene age and obviously greatly increased its values. The discovery well in the Stevens at Elk Hills proved to be a good well and there is every reason to believe the Stevens at Elk Hills should be as highly productive as it is in the Ten Section, Coles Levee and Tupman fields. Only two wells have been completed in the Stevens formation at the present time and it would be appropriate for OPC to permit all operators holding fee acreage to proceed with additional drilling to establish values as it remains to be seen whether the Stevens of Miocene extends over the entire Elk Hills structure.

Out on the north flank of the Paloma distillate field, General Petroleum Corp. has recovered from the mechanical trouble that has held up progress in 61-33 Gallagher at 11,043 ft. for the past week. The hole is now being conditioned and casing will be run in at once preparatory to an early production test. The most interesting thing in connection with this well is the fact that it has actually cored some oil sand that yields a normal high-gravity black oil. This is the first time that a normal black oil has been found in the Paloma distillate field and it may prove of considerable importance from a drilling and production standpoint. The Gallagher outpost is located about 1 mile from nearest production and far down on the north flank of the Paloma structure and substantially lower structurally than any other well drilled in the field to date. Core recoveries in General Petroleum Corp.'s outpost on the Gallagher lease have been very poor with the result the actual amount of oil sand is not definitely known. The well, on a recent formation test, showed up favorably and there is every reason to believe General Petroleum Corp. may develop commercial production.

Midway-Sunset Well Completed For Large Flow From Lakeview

Standard Oil Co. got a pleasant surprise in the Midway-Sunset field of Kern County this week when 15-19-D on fee-owned acreage in 19-32s-24e came in flowing between 1,000 and 1,500 bbl. per day along with 465,000 cu. ft. of natural gas. Only a relatively small pumping well was expected at this location due to the depleted condition of the oil zone with the result the crew was almost totally unprepared. Fortunately, safety devices were employed, as is done on every Standard well, and the well was easily brought under control. This well was completed in celebrated Lakeview sand which produced the famous Lakeview gusher back in 1910 but which has been yielding relatively small pumping wells for several years. It is quite likely Standard's 15-19-D will settle in the near future to a few hundred barrels per day as it is not likely there is enough kick to result in a sustained flow. The company shut the well in immediately subsequent to production and hence the rate of flow is only estimated on the basis of what the well did for 5 hours. Flow was through a 1-in. bean which was reduced after the well got under way and

finally closed tight. It is surmised the well hit a pocket of oil and gas that had been blanked off or sealed in some way to prevent it from reaching some other adjacent wells.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: Belridge Oil Co. 38-33-A fee, 32-28s-21e, pumped 60 bbl., 13.9 gravity, 20 per cent cut, T.D. 842 ft., perf. 490-734 ft., completed in upper Belridge zone of Pliocene age.

Belridge Oil Co. 58-33-A fee, 33-28s-21e, pumped 70 bbl., 14.9 gravity, 10 per cent cut, T.D. 800 ft., perf. 465-800 ft., completed in upper Belridge zone of Pliocene age.

Belridge Oil Co. 58-33 fee, 33-28s-21e, pumped 65 bbl., 14.8-gravity, 20 per cent cut, T.D. 775 ft., perf. 486-775 ft., completed in upper Belridge zone of Pliocene age.

Belridge Oil Co. 68-33-A fee, 33-28s-21e, pumped 65 bbl., 14.8 gravity, 15 per cent cut, T.D. 775 ft., perf. 444-775 ft., completed in upper Belridge zone of Pliocene age.

E. A. Parkford 5 Belridge, 12-29s-21e, pumped 65 bbl., 13.8 gravity, 7 per cent cut, T.D. 1,123 ft., 140 mesh perf. 979-1,121 ft., completed in new heavy oil accumulation of Pliocene age at extreme southeastern tip of South Belridge field.

Dyer Creek wildcat district, Kern County: Fred Jasper 1 Jasper, 16-26s-27e, dry, T.D. 4,421 ft., grit zone 3,355 ft., barren Vedder zone of Miocene age 3,362 ft., Walker zone 4,163 ft., bottomed in granite 4,398-4,421 ft.

Midway-Sunset, Kern County: Chanslor-Canfield Midway Oil Co. 20-27-G fee, 27-31s-22e, pumped 15 bbl., 14.2 gravity, 20 per cent cut, T.D. 1,295 ft., P.B. 1,140 ft., 140 mesh perf. 635-1,149 ft., completed in upper zone of Pliocene age.

Midway-Sunset, Kern County: Standard Oil Co. 15-19-D fee, 19-32s-24e, flowed 1,000 bbl., 22.9 gravity, 1 per cent cut, 465,000 cu. ft. gas, 64/64-in. bean, pressures 250/400 lb., T.D. 2,650 ft., perf. 2,540-2,650 ft., gusher sand 2,488-2,525 ft., completed in Lakeview sand 2,558-2,650 ft., Pliocene age.

Mount Poso, Kern County: Chanslor-Canfield Midway Oil Co. 8 Mon, 26-27s-28e, pumped 95 bbl., 15.6-gravity, 10 per cent cut, T.D. 1,466 ft., 130 mesh perf. 1,402-66 ft., completed in Vedder zone of Miocene age.

City Council Proceeding With Gilmore Island Project

The Los Angeles City Council is proceeding with the Gilmore Island project located within metropolitan Los Angeles just as though the mayor had not seen the bill. The mayor vetoed the measure granting Shell Oil Co. authority to drill in the Gilmore Island area and informed the council he would sign the measure provided they conformed with his desires in the matter. The council has since that time authorized the preparation of bids for a pipe line out of Gilmore Island under the proposal and in doing so has answered one of the mayor's questions as the pipe-line franchise provides the user shall pay the city of Los Angeles a royalty of 4 1/6 per cent on all crude oil produced in the projected field. The bids will be opened next week and the award made to Shell Oil Co. which will probably be the only bidder as it will be the only one to have any oil to ship. In the meantime, Shell Oil Co. is circulating petitions for a community lease to permit directionally drilled wells to produce from and be bottomed beneath adjoining acreage and town lots. The area now under consideration extends from June Street to Fairfax Avenue and from Santa Monica Boulevard to Wilshire Boulevard but it is quite likely that some blank spots will be found where property owners will not desire to put an easement on their property no matter how deep the well casing traverses their property. The Los Angeles City Council will hold public hearings on annexation proceedings and it may be determined at that time whether to take in all of the Gilmore Island or only a part of the island. While commenting on the Gilmore Island project it might not be amiss to mention that the county of Los Angeles is receiving checks for $7,750 each month as royalty on oil and gas produced from the Ranger zone from wells located on the west bank of the Los Angeles Flood Control Channel in the Wilmington field.

LOS ANGELES BASIN COMPLETIONS

Huntington Beach, Orange County: Signal Oil & Gas Co. 25 Bolsa, 34-5s-11w, pumped 194 bbl., 26.5 gravity, 1 per cent cut, T.D. 3,945 ft., P.B. 3,857 ft., perf. 3,652-3,857 ft., bottomed in gray water sand, completed in Bolsa Chica zone of Pliocene age.

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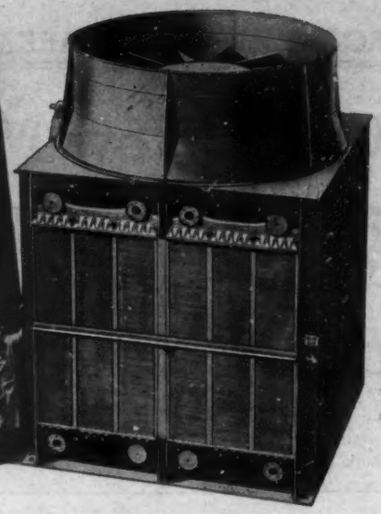

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ROCKY MOUNTAIN AREA

Open New Madison Lime Pool Northwest of Cut Bank Field

By T. R. INGRAM

DENVER, Colo.—Montana chalked up its most important oil discovery of the year the past week on the Reagan or Twin Rivers structure 2 miles south of the Canadian border and 8 miles northwest of the nearest producer in the Cut Bank field in Ed Reagan 2 Tribal-194, C NW NE 27-37n-7w, Glacier County. It swabbed and flowed 85 bbl. first 24 hours on September 23 and 2 days later was flowing at the rate of 4 bbl. an hour. It will run tubing and acidize. Its location is approximately a mile south of same operator's 1 Reagan, a gas discovery in the Madison lime last year which was completed at 3,869 ft. for 6,000,000 cu. ft.

The oil discovery had the top of the Colorado at 1,285 ft., the Kootenai at 3,170 ft., the Ellis at 3,650 ft., and the Madison at 3,816 ft., elevation 4,200 ft. It had a porous limestone in the top of the Madison showing gas saturation at 3,813-23 ft. At 3,823-41 ft. cores showed gas bubbles and specks of oil, followed by hard cherty limestone at 3,841-42 ft. It then cored porous limestone showing some oil at 3,842-44 ft. with streaks of good oil and gas sand at 3,849-59 ft. There was dense gray limestone at 3,859-80 ft., and porous oil-saturated limestone at 3,880-3,901 ft. Then it had white porous limestone carrying sulfur water at 3,901-06 ft., total depth. It was plugged back to 3,899 ft. Reagan and associates hold a Blackfeet Indian Tribal lease covering the entire structure.

Embar Discovery Showing Water

The Pilot Butte field, Fremont County, Wyoming, had two developments of interest. Superior Oil Co. 1 Stock, reported a discovery in the Embar horizon last week after plugging back from dry Tensleep, is showing considerable water and will make only a stripper well, having dropped down to around 100 bbl. a day on the pump, more than half of which is water. This well is located ⅝ mile southwest of 1 Tribal, the discovery in the Tensleep last spring which averaged 750 bbl. daily on the pump. Superior-British American 2-A Tribal, CEL NW SW 15-3n-1w, ⅝ mile north and west of the Tensleep discovery, is showing up for a much better well. It had the top of the Tensleep at 6,110 ft., set 6⅝-in. at 6,151 ft. and drilled to 6,354 ft., where it flowed 200 bbl. per day, natural. It is rigging up pump. British American 1 Suzanne Enos, a southwest offset to the Tensleep discovery, will be the next completion. It is coring at 6,351 ft.

Rio Oil Co., Inc. 1 Government, NW NW NE 28-3n-88w, Little Poose Creek structure, Rio Blanco County, Colorado, a wildcat watched with more than ordinary interest, has reached the Sundance, the first objective, and is shut down at 800 ft., pending decision as to whether it will be carried on down to the Pennsylvanian this year. It had a show of gas in the top of the Sundance at 398 ft., followed by a strong odor of oil, and went out of the sand at 605 ft. Hydrostatic pressure was lacking as no water was encountered below the surface water which was cased off at 162 ft. The Dakota outcrops.

The Douglas Creek wildcat in western Colorado being drilled by the Superior Oil Co., the Continental Oil Co. and the Union Oil Co. of California as a joint operation, is reaching a critical depth. It had the top of the basal Dakota at 4,379 ft. and a drill-stem test at 4,381 ft. open 15 minutes showed 25 ft. of drilling fluid and 821,000 cu. ft. of gas. It is drilling ahead in the Morrison at 4,560 ft.

Continental Oil Co. has started another well on South McCallum, Jackson County, Colorado, the first drilled since 1935, in its 4-A Hoye, NE NE SW 27-9n-78w. It has spudded and after setting surface pipe probably will shut down until spring on account of the cold winter weather in that area. The new well is ¼ mile southwest of 1 Hoye, which was completed in 1930 at 4,875 ft. for 50,000,000 cu. ft. of carbon dioxide gas with a few barrels of oil testing 45.8-gravity A.P.I. scale. In 1935 3 Hoye was completed to the north and was much the same as the discovery. South McCallum lies to the southeast of North McCallum where the company is drilling 5 Pollock, now down 2,510 ft.

The North McCallum and South McCallum wells were referred to last July by W. S. Parish, president of the Standard Oil Co. of New Jersey, when he stated that dry ice from these wells will play an important part in the rubber-production

(Continued on Page 76)

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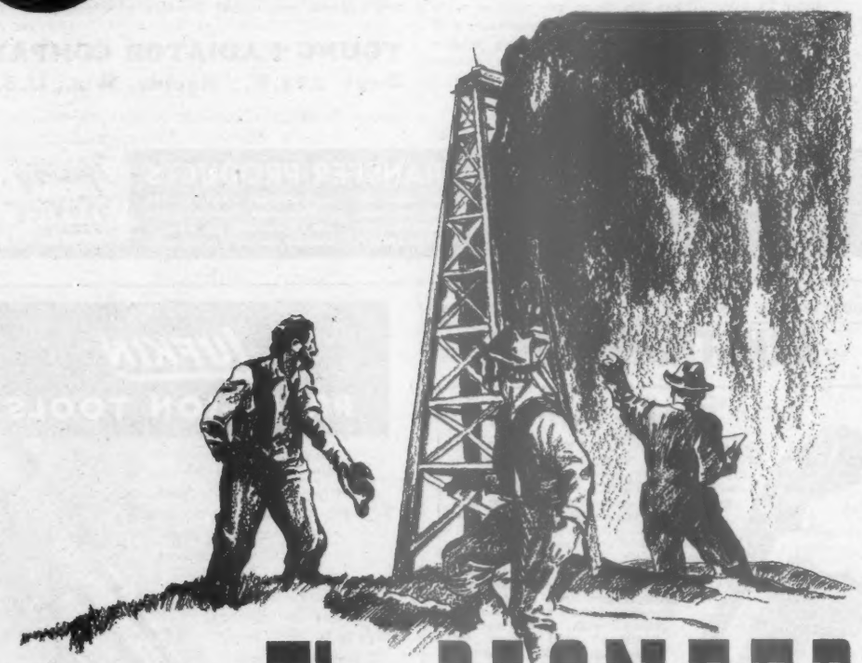

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NORTH CENTRAL TEXAS

Montague County Wells Plug Back to Test Shallow Zones

By ROBERT INGRAM

WICHITA FALLS, Tex.—Two deep Montague County wildcats were plugging back at the week's end to test shows in shallower zones. Both had drilled below 7,000 ft. and both went to the Ellenburger. Sinclair Prairie 1 Eanes, G. A. Bench Survey, in the extreme southwest part of the county, stopped at 7,070 ft., 157 ft. in the Ellenburger, and after that zone tested dry, cemented 5½-in. casing at 5,993 ft. to test upper pays.

This well topped the Marble Falls of the basal Pennsylvanian at 6,095 ft.; Barnett shale at 6,548 ft., and the Simpson, middle Ordovician, at 6,913 ft. Best show was found at 5,910-52 ft. in the conglomerate where 210 ft. of oil was recovered on a drill-stem test. This section has not yet proved a satisfactory pay zone in the Fort Worth basin, but probably will be thoroughly tested here.

The other plug-back operation was at Continental Oil Co. 1 Ketchum, Block 43, Hill C.S.L. Survey, 2 miles east of Bowie. It plugged back to 3,350 ft. from 7,506 ft. where it was a failure in the Ellenburger and was preparing to run casing to test the Strawn section.

Meantime, several other deep tests were being watched. Continental 1 Richardson, W. D. Savage Survey, south offset to Continental 1 Mueller, Simpson discovery, was shot with 20 qt. in pay at 7,254-59 ft. and was cleaning out at 7,257 ft., showing some oil. Total depth was 7,263 ft. The well previously had been treated with 3,000 gal. of acid. Top of the Simpson was 7,172 ft. with best pay at 7,254-63 ft.

Sinclair Prairie 2 Henderson, W. E. Martin Survey, offsetting a junked hole, ran tubing and started to circulate heavy mud out of the hole after perforating with 25 shots in casing at 6,065-70 ft. The well started gassing after circulating a while and operator then pumped heavy mud back into the hole and shut the well in overnight.

Magnolia Petroleum Co. 1 Medley, Fannin Survey, ¼ mile west of production in the Forrestburg Marble Falls pool of southeast Montague County, was drilling at 5,345 ft. in shale and lime.

Young County Tests

Hanlon-Buchanan, Inc., 1 Hunter, Block 20, T.E.&L. Survey, central Young County, east of the True area, was drilling at 4,052 ft. in the Caddo, with indication of water. It will drill ahead to the Mississippian before testing. Hanlon-Buchanan 1 Street, J. Conner Survey, offset to a recent Marble Falls discovery in the southeast part of the county, was cleaning up a fishing job at 4,784 ft. and ready to drill ahead.

Shell Oil Co. 2-A Bullock, Block 343, T.E.&L. Survey, south-edge test in the Madgitt Mississippian pool, topped the Mississippian at 4,778 ft., total depth 4,792 ft., and was circulating for samples.

Wise Wildcat Plugs Back

In northwestern Wise County, 1½ miles northwest of Park Springs, Stanolind Oil & Gas Co. 1 Menasco, Block 9, Falls C.S.L. Survey, bottomed at 7,310 ft. in the Ellenburger, plugged back to 6,725 ft. and will run casing. This is in the same general area as the Montague County tests.

NORTH TEXAS COMPLETIONS

Wildcats

Archer County: Chas. E. Morrison 1 L. F. Wilson, Lot 15, Blk. 40, A.T.N.C.L. Sur., dry, T.D. 1,464 ft.
W. R. Stafford 2 J. T. Richardson, W. C. McCune Sur. A-943, potential 10 bbl., T.D. 1,276 ft.
Thweatt & Gray 1 L. Turbeville, Blk. 49, J. W. Harris Club Ranch Sur., dry, T.D. 1,190 ft.
Wichita County: O. H. Hammer 1 F. W. Hamilton est., Sec. 22, H.&T.C. Sur., Blk. 7, dry, T.D. 2,179 ft.
Wilbarger County: W. T. Waggoner Est. 1 W. T. Waggoner-JJ, J. S. Calhoun Sur. A-945, dry, T.D. 4,572 ft.
Young County: W. F. Sorrells 1 T. D. Finley, Sec. 2, S.P. A-178, location abandoned.

Fields

Bowers, Cooke County: Lesh & McCall 1 W. D. Henley, G. W. Tilley Sur. A-734, dry, T.D. 2,970 ft.
Fish Creek, Young County: McLester & Keith 1 W. W. Griffin, Sec. 2, location abandoned.
Iowa Park, Wichita County: Hanlon-Buchanan et al 1 K. E. Murphree, Sec. 22, Tarrant Co. Sch. Ld. Sur. A-282, dry, T.D. 2,150 ft.
K.M.A., Wichita County: W. H. Hammon 14 fee, E.T. Sur. A-762, potential 481 bbl., T.D. 4,062 ft.
Petrolia, Clay County: Merrick & Goldsmith 1 Byers Bros., Sec. 15, Parker Co. Sch. Ld., dry, T.D. 374 ft.
Scotland, Archer County: Shell Oil 5-C D. Coleman-G. Lot 2, Blk. 74, A.T.N.C.L. Sur., dry, T.D. 5,660 ft.
Ringgold, Clay County: Continental Oil 5 E. Spring, Sec. 23, H.&T.C. Sur., Blk. 4, dry, T.D. 5,752 ft.
Thornberry, Clay County: Sussex Oil 32 E. A. Glasgow, Lot 34, Bacon sub., potential 45 bbl., T.D. 1,180 ft.
Walnut Bend, Cooke County: Sinclair Prairie 11 Neal P. Atkins, Sec. 69, Fannin Co. Sch. Ld., potential 110 bbl., T.D. 4,902 ft.

Miscellaneous

Archer County: Chas. E. Morrison 2 J. H. White, Lot 15, Blk. 40, A.T.N.C.L. Sur., dry, T.D. 1,464 ft.
H. A. Rathke 1 W. E. Rogers, Sec. 1596, T.E.&L. Sur., potential 5 bbl., T.D. 1,278 ft.
White & Duncan 4 J. T. Richardson, M.E.P.&P. A-715, pumped 335 bbl., T.D. 1,231 ft.
Cooke County: F. T. Johnson 1 J. I. Welch, M. W. Ross A-853, dry, T.D. 1,170 ft.
F. W. Merrick 1 W. McGeorge, B. Sullivant Sur. A-581, dry, T.D. 2,457 ft.
Young County: W. E. Production Co. 1 J. T. Hunt, Sec. 175, T.E.&L. Sur., dry, T.D. 1,150 ft.
Willis 1 M. Killian, Sec. 220, T.E.&L. Sur., dry, T.D. 990 ft.

Merkel Field Extended Short Distance to Southwest

FORT WORT, Tex.—Southwest extension 1,609 ft. was assured the Merkel field in Taylor County with completion of Fain-McGaha Oil Corp. 1 Perry, NE S½ Section 4, Grimes C.S.L. Survey 124. Initial gage reported was 100 bbl. in 30 minutes. Pay was from 2,575 ft. in lower Hope lime, and casing was set at 2,567 ft.

A northeast spread of 2,400 ft. may be in sight for the Wimberly pool in Jones County at Merry Brothers & Perini 1 J. F. Winters, J. Winters Survey, as the well found oil show in the upper Hope sand in going to 2,365 ft. Operators were to test.

Hope lime pay is found in the main field, but the well checked low on upper markers. It recovered some of its structural position. An east outpost, Fain-McGaha 1 Butler, G. W. Winters Survey, was completing from 2,184 ft. in the Tannihill sand, opening a new pay. It is 1,700 ft. from production, and initial gage was 9 bbl. an hour.

(Continued on Page 84)

EASTERN TEXAS FIELDS

Pettit Lime Discovery in Cherokee County Completed

By ROBERT INGRAM

DALLAS, Tex.—Humble Oil & Refining Co. 1 Curtis, John Vaughn Survey, Pettit lime strike on the Larrisa-Bullard structure of northwestern Cherokee County, was finally completed last week with a Railroad Commission potential of 37.31 bbl. of oil in 24 hours through ¼-in. tubing choke. Gas flow was 67,565 cu. ft. in 24 hours. Tubing pressure varied from 25 to 75 lb. with casing pressure of 910 lb. Gravity of the oil was corrected to 48° with 6 per cent b.s. and w.

Deep Hole in Freestone

Deepest active operation in the Tyler basin was Ohio Oil Co. 1 Hill, Dubronner Survey, 5 miles north of Butler in eastern Freestone County. Apparently in the basal Glen Rose section, the well had logged massive anhydrite at 8,980-95 ft. Other markers were Goodland, 7,190 ft., upper Glen Rose 7,490 ft., first anhydrite 8,618 ft. Porosity also was found at 8,330-45 ft., but no show was reported. Elevation is 346 ft. and the well is to go to the Travis Peak.

Waskom East Flank Gets Test

Roy L. Fisher 1 Auguers was announced as a wildcat test to the Travis Peak on the east flank of the big Waskom structure of eastern Harrison County, but just across the line in Caddo Parish, North Louisiana. Exact location is to be announced later.

Meantime, First National Petroleum Trust, Inc., endeavoring to open the west flank of the structure to oil production from the Pettit lime, perforated with 200 shots in the Pettit and will test. The well previously was completed through perforations at 5,904-6,008 ft., but the gas-oil ratio was reported so high the commission would not allow the well to produce.

Talco Well Still in Smackover

The Talco field's deep exploration, White & Vaughn 1 Jackson, Hopkins Survey, Franklin County, was drilling at 8,860 ft., still in the Smackover, which had been topped by survey at 8,580 ft. It is going through the section.

EAST TEXAS COMPLETIONS

Wildcats

Anderson County: Navarro Oil 1 H. B. Miller, William Churchwell Sur., dry, Pecon Gap 3,658 ft., T.D. 4,211 ft.
Hopkins County: Donnie Petroleum 1 S. A. Welborn, J. Webb Sur., dry, Paluxy 6,395 ft., T.D. 6,420 ft.
Hunt County: B. D. K. Oil 1 N. T. Lawler, T. R. Tennison Sur., dry, T.D. 3,010 ft.

Fields

Club Lake, Hunt County: Stanolind 1 R. C. Wise, John Warren Sur., flowed 129 bbl. through ¼-in. choke, T.D. 2,800 ft.

TEXAS GULF COAST

Mayo Field, Jackson County, Extended Half Mile Eastward

By F. L. SINGLETON

HOUSTON, Tex.—Although development in the Mayo-Harmon fields, Jackson County, has been curtailed during the past several weeks, additional acreage continues to be opened for drilling. The latest completion in this area extended production of the Mayo area approximately 3,000 ft. eastward. The producer, Louis Crouch 1 A. A. Lundy, located in the Morris & Cummings Survey 15, was completed through casing perforations at 5,358-76 ft., 5,380-86 ft., and 5,392-98 ft., for an initial production of 96 bbl. daily through a 5/32-in. choke. The operator has tentative location for 2 Lundy, several hundred feet south of the producer, while an east offset will probably be started by Tide Water Associated Oil Co.

Promise of opening a new shallow sand discovery for Jackson County was not promising as the Texas Co. continued to test 1 O. D. Collier, located 5 miles northeast of the town of Edna. At the close of the week, casing was perforated at 2,495-2,504 ft., and the well was flowing 3½ bbl. of fluid per hour through a ¼-in. choke of which 1 per cent was oil and the balance water and sand. Northwest of Edna on the same trend, and centering in the J. Andrews Survey, Texas Co. staked location for 1 B. Bonham. The two prospects are on strike with the Cordelle field which is one of the best shallow sand pools in the county. Main attention in the county has been directed to the Marginulina-Frio formation in the southern portion of the county.

Lake Creek Field Extended

With the completion of Superior Oil Co. of California 1 E. G. Frost which marked up a 3-mile northeast extension to the Lake Creek field, Montgomery County, the company began moving in for another wildcat being 1 Blanche Foley, 3½ miles west of Tamina in the H. Dunam Survey. The Tamina prospect has been looked upon as a favorable structure for sometime in view of the showings logged in a deep test drilled in the area last year. There are three other active wildcats in the county which are being watched with interest. These include La Gloria et al 1 Grogan-Cochran, 3 miles southeast of Magnolia, drilling below 10,901 ft., George W. Strake 1 Guaranty State Bank, T. Cade Survey, drilling in sandy shale below 9,782 ft., and the same operator's 1 T. J. Peel, 4 miles northeast of the town of Montgomery which is drilling in shale below 7,673 ft.

In Brazoria County, 1½ miles northeast of the town of Velasco, Amerada 1 D. J. Sullivan, H. Henry Survey, which has been held up due to stuck drill stem at a total depth of 7,183 ft., recovered the drill pipe to 4,823 ft., and the hole is to be sidetracked at 4,811 ft. The drill stem became stuck due to an attempted blowout.

North Bay City Offsets Ready to Test

In the North Bay City field, Matagorda County, Ohio Oil Co. was preparing to retest 1 McDonald Account 2 after the well showed for a high gas-oil ratio producer when tested through perforated casing at 7,862-76 ft. Tubing pressure was 2,800 lb., and casing pressure 1,650 lb. The well correlates about normal with the discovery well, completed last month at approximately the same depth. In the meantime, Sun 1 McDonald, a south offset to the discovery well is reported to have logged the upper sands and casing was expected to be cemented for testing the first of the week.

TEXAS GULF COAST COMPLETIONS

Wildcats

Matagorda County: Continental 1 Hugheley, dry, T.D. 5,852 ft.

Fields

Goodrich, Polk County: Pan American 5-B Texas Long Leaf Lumber Co., dry, T.D. 4,250 ft.

Lake Creek, Montgomery County: Superior 1 E. G. Frost, 160 bbl., 22/64-in. choke, perf. casing 11,508-33 ft., T.D. 13,293 ft.

Mayo, Jackson County: L. Crouch 1 A. A. Lundy, 96 bbl., 5/32-in. choke, perf. casing 5,358-98 ft., T.D. 5,620 ft.

Saratoga, Hardin County: Rio Bravo 50-T fee, dry, T.D. 2,073 ft.

Withers, Wharton County: Texas 94-B Pierce, 62 bbl. oil and 22 bbl. salt water, 22/64-in. choke, perf. casing 5,350-34 ft., T.D. 5,545 ft.

Rocky Mountain Area

(Continued from Page 74)

program. He declared he had been assured processes for the separation of the carbon dioxide gas from the oil have reached a stage where dry ice can be produced at the rate of 10,000 tons annually by next November. Information regarding the processes is restricted, but it is known that experiments in producing one of the McCallum wells have been under way for several months.

COLORADO COMPLETIONS

Long Hollow, La Plata County: McGarr Pet. Co. 1 Pinon Mesa, CSL NE NE 34-33n-12w, plugged and abandoned at 3,680 ft., in the McElmo formation, elev. 6,650 ft.

Chimney Creek, Routt County: Broderick & Gordon 1 Government, SE SW 18-7n-86w, T.D. 3,260 ft., 2 ft. in igneous rock, plugged and abandoned.

WYOMING COMPLETIONS

Pilot Butte, Fremont County: Superior Oil Co. 1 Stock, CEL NE NE 21-3n-1w, T.D. 6,750 ft., 80 ft. in dry Tensleep horizon, P.B. to 6⅝-in. at 6,671 ft., perf. in Embar at 6,150-6,210 ft., acidized, swabbed 500 bbl. per day, cutting 30 per cent water, pumped 300 bbl. fluid, considerable water, first 24 hours, soon dropped to around 100 bbl., 30 to 80 per cent water.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Texas Co. 1 Storey, C NW NE 21-32n-5w, T.D. 2,775 ft., 7-in. 2,720 ft., upper Cut Bank 2,715-65 ft., no lower Cut Bank, 50 ft. fluid after standing 16 hr., will shoot.

Frances Oil Co. 3 Tribal-201, NE SW NE 30-32n-5w, T.D. 2,880 ft., 6⅝-in. 2,831 ft., Cut Bank sand 2,810-78 ft., main pay 2,843-78 ft., swabbed and flowed rate of 33 bbl. per hr., no sustained 24-hr. test, will swab for several days and then shoot.

Kevin-Sunburst, Toole County: Hardrock Oil Co. 6 Waite, NE NE SW 12-35n-2w, T.D. 1,540 ft., contact 1,532-40 ft., shot 40 qt., acid, 1,000 gal., pumped average 18 bbl. daily on 10-day test.

Midway, Pondera County: R. C. Tarrant 1 DeStaffany, C NW NE 30-28n-1w, T.D. 1,746 ft., 5½-in. 1,726 ft., Sunburst sand 1,725-45 ft., 300 ft. fluid in hole, no water, pumped 8 bbl. 43.5-gravity oil in 5½ hr., now pumping 5 bbl. per day.

Reagan, Glacier County: Ed Reagan 2 Tribal-194, C NW NE 27-37n-7w, T.D. 3,906 ft., P.B. to 3,899 ft., swabbed and flowed 85 bbl. first 24 hr. from the Madison.

LOUISIANA GULF COAST

Deer Island Prospect Proven For Gas Production

By F. L. SINGLETON

NEW ORLEANS, La.—The Deer Island prospect, Terrebonne Parish, was proven for gas production with the completion of Humble 2 Continental Land & Fur Co. in the southwestern portion of the parish. The well was originally drilled to a total depth of 11,470 ft., where drilling was halted due to a strong salt-water flow. The hole was plugged back to 9,578 ft. and casing perforated at 9,565-70 ft. While no gage had been made, it flowed an unestimated amount of dry gas through a ¼-in. choke with tubing pressure 3,650 lb. The discovery is located on a geophysical block consisting of several thousand acres centering in 24-18s-12e.

While the above well was being tested, two other wildcats in La Fourche and Acadia parishes were showing for pool openers. In La Fourche Parish and located on the Bully Camp prospect, Gulf Refining Co. was preparing to fish for drill stem in 1 Delta Securities Co., which blew out from a depth of 1,374 ft. The well flowed an unestimated amount of gas and sand before it was brought under control. Location is in 1-19s-20e, about 9 miles northeast of the Lirette field, and about 5 miles northwest of the Golden Meadow field.

In the Branch area, Acadia Parish, Union Sulphur Co. was preparing to cement a protection string of casing in 1 Gueno after an electrical survey and side-wall cores showed three sands. Total depth is 10,252 ft. with the gas sands logged at 9,510-30 ft., 9,838-54 ft., and 10,004-14 ft. The well is situated in 51-8s-2e, about 5 miles west of the Bosco field and 7 miles east of the North Crowley field.

Gulf 1 Hass-Hirsch, a wildcat located 3 miles southwest of Krotz Springs, St. Landry Parish, was being watched with considerable interest as a protection string of 9⅝-in. casing was being cemented at 8,222 ft. The casing was cemented following the running of an electrical survey, and while details of the electrical log were not available, the well is reported to have logged several sands in the Marginulina formation. Correlated with a dry hole, drilled in the area several months ago, it is 52 ft. structurally higher.

In the Grosse Tete area, Iberville Parish, Amerada Petroleum Corp. is expected to announce a new wildcat operation for this prospect following the abandonment of 1 Angelloz, which was junked and abandoned at a total depth of 10,426 ft. This well blew out 2 weeks ago, caught fire and most of the drilling rig was destroyed.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

Iberville Parish: Amerada 1 Angelloz, well blew out, caught fire, junked and abandoned, T.D. 10,426 ft.

St. James Parish: Cities Service 1 Karstein, dry, T.D. 11,502 ft.

Fields

Bayou Couba, St. Charles Parish: Gulf 1 Delta Securities Co., 373 bbl., ¾-in. choke, perf. casing 6,536-42 ft., T.D. 6,917 ft.

Gueydan, Vermilion Parish: Pure 2 Alliance Trust Co., 122 bbl., 10/64-in. choke, perf. casing 9,688-9,700 ft., T.D. 9,852 ft.

Leeville, La Fourche Parish: Texas 1 City of New Orleans, well blew out, caught fire, junked and abandoned, T.D. 5,200 ft.

Port Allen, West Baton Rouge Parish: Amerada 1-A Southern Land Co., dry, T.D. 9,847 ft.

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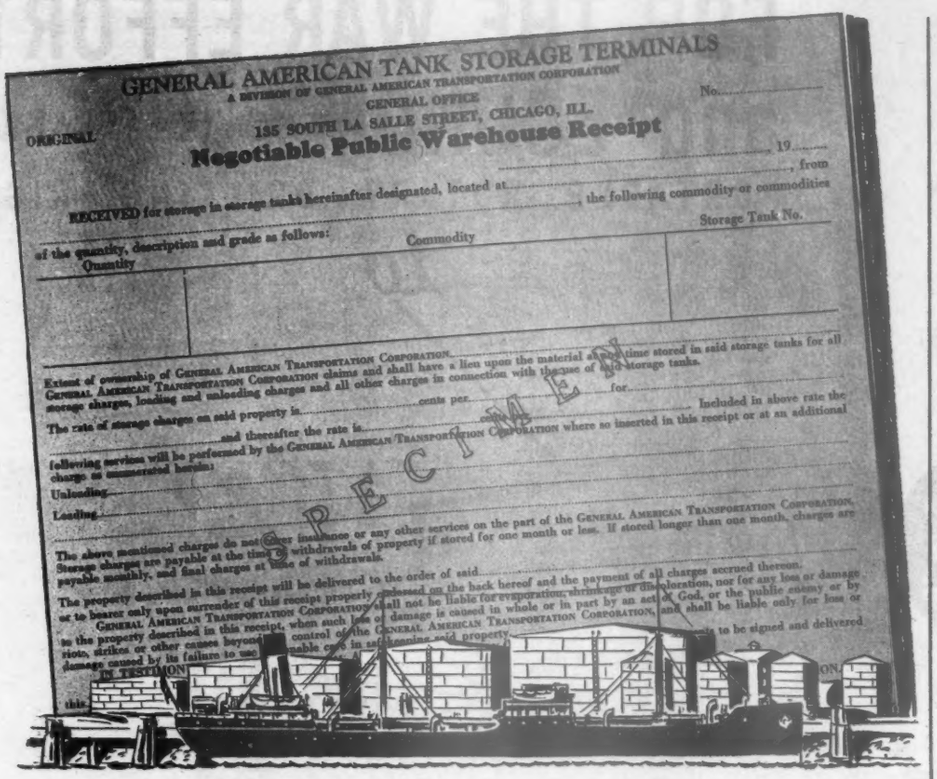
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APPALACHIAN FIELDS

Hancock County Discovery Makes Small Producer

PITTSBURGH, Pa.—In Hancock County, West Virginia, the Oriskany test in Clay district was completed and shot the second time. The flow of gas was increased over that after the first shot but it did not hold up.

SOUTHWEST PENNSYLVANIA

On Chestnut Ridge in South Union Township, Fayette County, Greensboro Gas Co. was cementing caving hole in 2 Barton at 6,620 ft. and was drilling at 6,753 ft. in No. 3. At 2 Indian Creek Coal & Coke Co., New Penn Development Co., William E. Snee et al were drilling at 1,648 ft. Peoples Natural Gas Co. was drilling at 4,507 ft. in 1 Walters and the hole was still caving.

On Laurel Ridge, Ligonier Township, Fayette County, New Penn Development Co. et al were drilling in 1 John and Eleanor Beck at 4,507 ft.

On the Accident dome in Garrett County, Maryland, William E. Snee et al were drilling by the old tools at 4,390 ft. at 1 Speicher.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Kittanning Township: Local Co. 2 Hugh Blair, 19,000 cu. ft. gas, T.D. 3,665 ft.
South Bend Township: Shelocta Gas Co. 1 Samuel Saltsgiver, dry, T.D. 3,318 ft.
Valley Township: Peoples N. G. Co. 1 Earl McElwain, dry, T.D. 3,476 ft.
Clarion County, Clarion Township: T. Swartfager et al 1 James Harvey, 44,000 cu. ft. gas, Murraysville, Hundred-foot, Speechley and Tiona sands, T.D. 2,626 ft.
Fayette County, German Township: Brumage et al 1 Tony Lavaca, dry, T.D. 1,904 ft.
Washington County, Cross Creek Township: John Johnson 1 E. Denny Brown, dry, T.D. 2,694 ft.

WEST VIRGINIA

In Clay district, Hancock County, John T. Galey et al completed 1 Lenora Ramsey at a depth of 4,829 ft. The well was shot the second time at 4,770-77 ft. with 550 lb. of gelatin and the gas increased to 365,000 cu. ft. In 3 days it had blown down to 115,000 cu. ft. The well will be tubed and produced.

In Grant district, Ritchie County, Benedum & Trees were shut down at 7,315 ft. in 1 J. L. Rinehart. In Meade district, Tyler County, the tools were lost in the 1 Pearl Broadwater and they were drilling by at 5,610 ft. In Spring Creek district, Wirt County, they were drilling at 4,705 ft. in 1 Park Smith. Fishing operations were still going on at 5,362 ft. in 1 W. W. Campbell, Union district, Pleasants County, and in Reedy district, Roane County, they have skidded the rig at 1 H. E. Criner and were drilling in the new hole at 900 ft.

WEST VIRGINIA COMPLETIONS

Boone County, Scott district: Owens, Libby-Owens 43-641 Cassingham Coal Land Co., 198,000 cu. ft. gas, R.P. 180 lb., Salt sand 965 ft., T.D. 969 ft.
Calhoun County, Sherman district: Hope Const. & Ref. Co. 3 Laurel McDonald, 8 bbl., Big Injun, T.D. 2,177 ft.
Sherman district: Creed Yoak and H. S. Brown 3 Edith Z. McDonald, 10 bbl., Big Injun, T.D. 2,087 ft.
Sherman district: South Penn Nat. Gas Co. 10 J. S. Sharpes 2 bbl., Big Injun, T.D. 1,984 ft.
Harrison County, Sardis district: Eagle & Clay Gas Co. 1 O. C. Strother, 100,000 cu. ft. gas, Fifty-foot 2,240 ft., gas 2,250-57 ft., T.D. 2,950 ft.
Jackson County, Ravenswood district: Columbian Carbon Co. 1 Henry Wallbrown, 2 bbl. after shot, Berea 2,638-43 ft., T.D. 2,653 ft.
Kanawha County, Poca district: South Penn Nat. Gas Co. 1 G. W. Burdette, 10 bbl., Big lime, T.D. 1,706 ft.
Virginian Gasoline & Oil Co. 5 J. A. Wines, dry, Big lime, T.D. 1,667 ft.
Lincoln County, Sheridan district: United Fuel Gas Co. 2217 Lincoln Co. Land Co. Assn., 84,000 cu. ft. gas, brown shale 2,190-2,257 ft., 2,262-2,302 ft., 2,850-3,122 ft., gas 2,990 ft., T.D. 3,127 ft.
Marion County, Mannington district: South Penn Nat. Gas Co. 15 Jacob Cunningham, 3 bbl., Fourth, T.D. 3,280 ft.
Monongalia County, Clay district: Chartiers Oil Co. 3

(Continued on Page 82)

ILLINOIS FIELD REPORT

Blairsville Well Has Large Flow From Aux Vases Sand

MATTOON, Ill.—Illinois operations have increased approximately 76 per cent since the issuance of M-68-5, a liberalization of federal spacing order, M-68. First reports for the week totaled 51, a decrease of 13 from the previous week, and will probably level off at about this figure unless new pools are discovered.

Operators in the state have only 3 months left during which to drill on 10 and 20-acre locations permitted by the relaxation of the spacing order. The administrative order granting exceptions to the general 40-acre rule will expire January 1, 1943.

In the new Blairsville pool of Hamilton County, Magnolia Petroleum Co. has completed the 1 G. Travis, NW SE 20-4s-7e, as one of the largest flowing wells in the state for several months. The well started flowing while being cleaned out and produced naturally at the rate of 975 bbl. daily. It is producing from the Aux Vases sand at 3,272-3,303 ft.

Texas Co. has completed an offset to their 1 Minton, discovery well of the Blairsville pool, at the 1 H. N. Ernst, E½ NW NW 21-4s-7e. On a 14-hour production test the 1 Ernst swabbed and flowed 140 bbl.

Phillipstown Well Testing Tar Springs Sand

Jarvis Brothers and Marcell are making a production test on the 2 C. T and E. Spencer, SE SW SW 31-4s-11w, in the Phillipstown pool. The test is in the Tar Springs sand at 2,310-26 ft. after a 40-qt. shot. The well swabbed at the rate 585 bbl. in 24 hours, one of the largest production gages ever reported from this formation outside the Benton field.

Meanwhile, Sun Oil Co. has extended the pool a short distance to the south with the completion of 3 Hoosier-Spencer, NW NE NW 6-5s-11e. No. 3 Hoosier-Spencer was completed as a pumping well, producing at the rate of 75 bbl. daily from the Tar Springs at 2,275 ft. In the same area, Jarvis Brothers and Marcell are preparing to drill plug to test the Tar Springs at 4 E. Spencer, S½ NE SW 31-4s-11e. Saturation at 4 Spencer was recovered from 2,286-97 ft. and 2,300-18 ft. with the hole bottomed at 2,318 ft.

ILLINOIS COMPLETIONS

Wildcats

Clay County: National Refining 1 Tolliver, SW NE 2-3n-7e, dry at 2,967 ft., McClosky 2,947 ft.

Gallatin County: Cherry & Kjdd 1 Kerwin, NE NE SW 11-8s-10e, pumped 192 bbl., Palestine 1,840 ft., T.D. 1,863 ft.

Roy Powers 1 West, NE SW 28-7s-8e, dry at 2,873 ft., Aux Vases 2,744 ft., McClosky 2,855 ft.

Hamilton County: Texas 1 Helfner, NE SE SW 7-6s-6e, pumped 13 bbl., Aux Vases 3,104 ft., T.D. 3,278 ft.

Marion County: Papoose 1 Snelling, NE SE SW 35-4n-3e, dry at 2,479 ft., McClosky 2,405 ft.

Perry County: Texas 1 Leich, SE SE NW 14-4s-4w, dry at 1,691 ft., McClosky 1,502 ft.

Shelby County: H. Simms et al 1 Bauer, SE NW NE 21-11n-3e, dry at 1,938 ft., Aux Vases 1,730 ft., Ste. Genevieve 1,925 ft.

Wayne County: Continental et al 1 Osborn, W½ NE SW 17-2s-8e, pumped 22 bbl., Aux Vases 3,236 ft., T.D. 3,389 ft.

Texas 1 Garner, W½ NE NW 6-2s-6e, dry at 3,230 ft., McClosky 3,174 ft.

Fields

Akin, Franklin County: Seaboard 5 U. S. Coal & Coke, NW SW 23-6s-4e, dry at 3,268 ft, Ste. Genevieve 3,119 ft., McClosky 3,159 ft.

Bible Grove, Clay County: Pure 3 Nodler, SE NE SW 4-5n-7e, pumped 160 bbl., Cypress sand 2,495 ft., Weller 2,518 ft.

Bluford, Jefferson County: Tide Water 1-B Newton, N½ NE SW 1-3s-4e, pumped 267 bbl., McClosky 3,081-91 ft., T.D. 3,096 ft.

Boulder, Clinton County: Texas 4 Gray, NE SW SW 35-3n-2w, dry at 1,242 ft.

Clay City, Wayne County: J. R. Black 1 Judd, NW SE 10-1n-8e, pumped 25 bbl., McClosky 3,101 ft., T.D. 3,114 ft.

Covington, Wayne County: Deep Rock 2 Craig, E½ NW SE 30-1s-7e, pumped 709 bbl., McClosky 3,227-33 ft., T.D. 3,251 ft.

Geff, Wayne County: Dee Bros. 1 Warren, NW NW NE 13-1s-7e, dry at 3,213 ft., McClosky 3,170 ft.

Pure 1 Murphy, NW SW SE 12-1s-7e, dry at 3,220 ft., McClosky 3,208 ft.

Hoodville, Hamilton County: Texas 4 Edwards, NW SW SW 2-6s-6e, pumped 22 bbl., Aux Vases 3,064 ft., T.D. 3,081 ft.

Louden, Fayette County: Carter 2-7 McCollum, SW NE SW 2-8n-3e, T.D. 1,628 ft., gas-input well.

Carter 11-1 Sloan, NW 11-8n-3e, gas-input well, T.D. 1,632 ft.

Carter 17 Wright, SW NW SE 20-8n-3e, pumped 174 bbl., Weller 1,496 ft., Cypress 1,469 ft.

Mason, Effingham County: Tide Water 3 Burk, NW SE SW 27-6n-5e, pumped 112 bbl., Bethel 2,301 ft., T.D. 2,314 ft.

Noble, Richland County: Carter 1 Winters, NW NW 10-3n-9e, pumped 175 bbl., Weller 2,524 ft., T.D. 2,627 ft.

Pure 30 Coen, SE NE 9-3n-9e, pumped 160 bbl., Weller 2,590 ft., T.D. 2,650 ft.

Phillipstown, White County: Sun 1 Hoosier-Spencer, N½ NW NW 6-5s-11e, pumped 75 bbl., sand 2,275 ft., T.D. 2,314 ft.

Robinson, Crawford County: C. M. Page 1 Dennis, NE SE SW 2-6n-13w, dry at 1,916 ft.

W. A. Waymeir 1 Buck, SW SE SW 4-6n-13w, dry at 2,817 ft., Aux Vases 1,426 ft., Ste. Genevieve 1,438 ft.

Rural Hill, Hamilton County: Ohio 2 Moore, NE NW NE 35-6s-5e, pumped 3 bbl., Aux Vases 3,230 ft.

Ohio 4 Moore, NE NW NW 35-6s-5e, pumped 35 bbl., Aux Vases 3,276 ft., T.D. 3,286 ft.

St. Jacob, Madison County: Shell 1-A Faires, SW SW SE 27-3n-6w, pumped 239 bbl., Trenton 2,296 ft., T.D. 2,337 ft.

Sinclair-Wyoming 1 Ellis, SW SE SW 27-3n-6w, swabbed 106 bbl., Trenton 2,318 ft., T.D. 2,336 ft.

Sinclair-Wyoming 2 Ellis, SW SW NW 27-3n-6w, pumped 154 bbl., Trenton 2,341 ft., T.D. 2,364 ft.

Ste. Marie, Jasper County: Roy Powers 1 Kraus, E½

(Continued on Page 82)

MICHIGAN OPERATIONS

Productive Area of Evart Field May Be Limited

By OTTO C. PRESSPRICH

SAGINAW, Mich.—Two failures offsetting one heavy-oil producer last week in Osceola County's Evart field, evidently indicated the field will be small. A development in Zeeland of Ottawa County gave some promise of new production for that area.

Sun Oil Co. 1 Rohrer, in Section 27, Osceola, came in for 50 bbl. an hour and marked the first completion in the state using the welded-casing method. Serving, meanwhile, to limit producing boundaries, in Section 22, Osceola, Sun Oil 1 Wirth was given up as a dry hole at 4,457 ft. when a fishing failure halted plans to drill possibly to 5,000 ft. Also a dry hole was Michigan Producers & Refiners, Inc., 1 Oren in Section 27. Ohio Oil Co. completed a small Traverse producer in the Reed City field, but in Orient Township, a Gordon Oil Co. wildcat test failed.

Outlook for the Zeeland-Ottawa section depends on results following the completion of C. A. Perry-Gould & Cross 1 Baron & Nykamp in Section 31, a mile south of other production. It was rated at 100 bbl. of oil with a mixture of water. A Jamestown-Ottawa wildcat test by Lester Harris was dry.

Michigan operations last week resulted in a total of 16 completions, eight bringing oil. Ranked next to the Sun Rohrer for production was Sun's 1 Doherty in Section 35 of Beaverton, Gladwin County. After acid treatment, the well flowed 383 bbl. in 13 hours from 3,883 ft. Other wildcat failures were recorded in Oakland and Oceana counties.

Permits for 14 more oil and gas tests were approved by the state Conservation Department, bringing the 1942 permit total to 436. Allegan, Missaukee, Ottawa, Osceola and Mecosta locations were announced to two permits each, the others for locations in Gladwin, Lenawee, Roscommon and Van Buren counties.

The state oil advisory board has forwarded to Washington industry recommendations designed to increase Michigan output. Reporting that it had conferred with and received approval from 95 per cent of operators concerned, the board reaffirmed its support of a proposal to permit operators with wells producing from Traverse formation on a 40-acre drilling unit to drill another in the Monroe, generally 600 ft. lower, on the same unit.

MICHIGAN COMPLETIONS

Allegan County, Dorr Township: James T. McGerry, trustee 1 Nagarski, SW SW SE 36-4n-12w, wildcat, dry, T.D. 1,188 ft.

Trowbridge Township: A. W. Winchester 2 Russell, E½ NW SE 30-1n-13w, pumping 65 bbl. and salt water, acidized, T.D. 1,346 ft.

Bay County, Kawkawlin Township: Chapman Oil Co. 1 Macey-Moeller, C N½ NW SE 34-15n-4e, pumping 92 bbl., acidized, T.D. 2,935 ft.

Gladwin County, Beaverton Township: Sun Oil Co. 1 Doherty et al, C E½ NW NW 35-17n-2w, 383 bbl., acidized, first 13 hr., T.D. 3,883 ft.

Missaukee County, Riverside Township: Taggart Brothers Co. 59 Noordnock et al, C SE 21-21n-7w, dry, T.D. 1,430 ft.

Oakland County, Milford Township: Fisher-McCall Oil & Gas, Inc. 1 Tireman, C NE SE 32-2n-7e, wildcat, dry, T.D. 1,290 ft.

Oceana County, Greenwood Township: Muskegon Development Co. 1 Bregalle, C SW NW 32-13n-15w, wildcat, dry, T.D. 2,048 ft.

Osceola County, Lincoln Township: Ohio Oil Co. 1 Kent, C S½ SE SW 18-18n-10w, 113 bbl., natural, T.D. 2,972 ft. in Traverse.

Orient Township: Gordon Oil Co. 1 Sprague, C N½ SW NW 9-17n-7w, wildcat, dry, T.D. 1,878 ft.

Osceola Township: Sun Oil Co. 1 Wirth, C N½ NE SE 22-18n-8w, dry, T.D. 4,457 ft.

Michigan Producers & Refiners, Inc. 1 Oren, C N½ NE SE Sec. 27, dry, T.D. 3,754 ft.

Sun Oil Co. 1 Rohrer, C N½ SE NE Sec. 27, 224 bbl. natural in 4 hr., T.D. 3,706 ft.

Richmond Township: Gulf Refining Co. 1 Bregg, C N½ SW SW 5-17n-10w, temporarily abandoned, T.D. 3,577 ft.

Ottawa County, Jamestown Township: Lester Harris 1 Van de Bunde communitized, C N½ NE NW 21-5n-13w, wildcat, dry, T.D. 1,717 ft.

Tallmadge Township: John C. Newell A-1 Bronkema, NE NW NW 23-7n-13w, pumping 5 bbl., acidized, T.D. 1,886 ft.

Zeeland Township: C. A. Perry-Cross & Gould 1 Baron & Nykamp, SE SW NE 31-5n-14w, pumping 100 bbl. and salt water, acidized, T.D. 1,477 ft.

Van Buren County, Bangor Township: T. C. Hudson 5 Starz, SE SW SW 21-2s-16w, pumping 75 bbl. and salt water, acidized, T.D. 999 ft.

Rumor Major Development In Athabaska Tar Sand Area

By VICTOR LAURISTON

CHATHAM, Ont.—Crude and natural gasoline production from all Alberta fields for the week ending September 21 averaged 26,847 bbl. daily, compared with 27,529 bbl. daily for the previous week and 28,962 bbl. daily for the corresponding week last year.

Decline in production from a year ago of 2,115 bbl. daily is due in part to the reduced production of the older crude wells on the west flank of South Turner Valley, which has not been offset by new completions in the past month. There is also some decline as a result of the full enforcement of the Brown conservation plan, which, however, is expected to ensure a greater aggregate production in the long run.

Lime Proven in South

Northwest-Hudson's Bay 8, LSD 2-3, 8-18-2w5, most southerly well in the Turner Valley field, got the Madison limestone at 8,214 ft. and is deepening after cementing casing at 8,231 ft. This proves the lime ¼ mile southwest of Northwest-Hudson's Bay 6, the most southerly producer, and may lead to a renewal of activity on two tests a little farther south, Brown Corp. 6, standing at 4,517 ft. and Theo. Grewer 1, standing at 1,203 ft.

TURNER VALLEY LIME TESTS

North Turner Valley: Foothills Oil & Gas 9, LSD 14, 27-20-3w5, below 7,330 ft., Madison at 6,214 ft.

Royalite Oil 64, LSD 13, 22-20-3w5, T.D. 8,995 ft., Madison at 8,328 ft., water in lower zone plugged off, upper porous zone shows around 425 bbl. daily, testing for allowable.

Northern Extension

In the North Turner Valley extension, Hastings Royalties 1, LSD 3, 30-21-3w5, has been abandoned in lower Benton formation at 7,652 ft. Farther south, Maryland Petroleums 1, financed by Robert Stillman and associates of Toronto, will drill in LSD 8, 18-21-3w5, north and west of Atlas-British Dominion 2, the most northerly producer.

Royalite Oil 68, LSD 10, 22-20-3w5, has spudded and is below 105 ft.

Tar Sand Development

Following a government investigation earlier in the year, extensive shallow drilling has been done in the McMurray area of northern Alberta to determine the extent and possibilities of the bituminous sand deposits. At a conference recently in Edmonton, plans were made for preliminary development of the deposits on the basis of the information already secured, as well as for an expansion of the shallow drilling program into additional areas. Construction of a separation plant with a potential output of 10,000 bbl. daily is under consideration. It is expected that the plant will include both separating and refining processes. These operations are apart from tests carried out near the separation plant of Abasand Oils, Ltd., which is operating with a maximum capacity of 500 bbl. daily.

Southern Alberta

In the Taber field, southern Alberta, Standard of British Columbia 1, LSD 9, 18-9-16w4, has started pumping test of a producing horizon around 3,161 ft. Flush production around 400 bbl. daily of 18-gravity crude is indicated, and arrangements have been made to ship 250 bbl. daily to the Huff refinery at Lethbridge. Clancey-Hi Test 1, LSD 7, 24-9-17w4, fishing at 2,665 ft., has plugged back to 2,000 ft. and is setting whipstock.

Northwest Co. is preparing to drill in the Vauxhall district, about 18 miles north of the Taber field, following a series of structure tests.

Standard Oil of British Columbia has made location in the Ross Lake-Twin River area, in LSD 4, 17-2-22w4, about 6 miles northwest of Del Bonita 1. Location was made on the basis of seismographic surveys started last May. Standard has taken over more than 11,000 acres from E. L. Cord, Western Drilling and Ross Lake-McIntyre Ranch holdings. Drilling will probably start this month.

Vermilion Field

In the Vermilion field, eastern Alberta, Saskahead 1, LSD 7, 32-50-5w4, was finished below 1,835 ft. and was testing production. Elmore 1, LSD 16, 20-50-5w4, and Midfield 3, LSD 12, 20-50-5w4, were coring oil sand. Northwest-Islay 1, LSD 16, 34-50-5w4, about 2 miles northwest of the field, has spudded and is below 1,000 ft.

Some 20 miles southwest of Vermilion, a joint test of Anglo-Canadian and Home Oils on Buffalo Creek, in LSD 16, 26-47-7w4, was spudded. Location is midway between the Wainwright and Vermilion producing areas.

Tilley Field

In the Tilley field, eastern Alberta, Imperial-Tilley 7, LSD 7, 18-17-2w5, was coring below 3,200 ft. and near completion. Imperial-Monogram 2, LSD 4, 30-16-9w4, was below 2,993 ft.

Athabaska Test Starting

In the Athabaska area, northern Alberta, Athabaska Oil & Gas Syndicate 1, LSD 14, 10-66-23w4, has cellar dug and was moving equipment. This well offsets Athadome Oils 2, drilled about 1929, which encountered heavy crude around 1,650 ft. but attempted to reach the underlying limestone and later was unable to recover and test the shallower production. Location for the new test was made by Russell V. Johnson, of Calgary. Deca 1 has been spotted in LSD 1, 4-66-22w4, east and south of Athabaska 1.

Saskatchewan Drilling

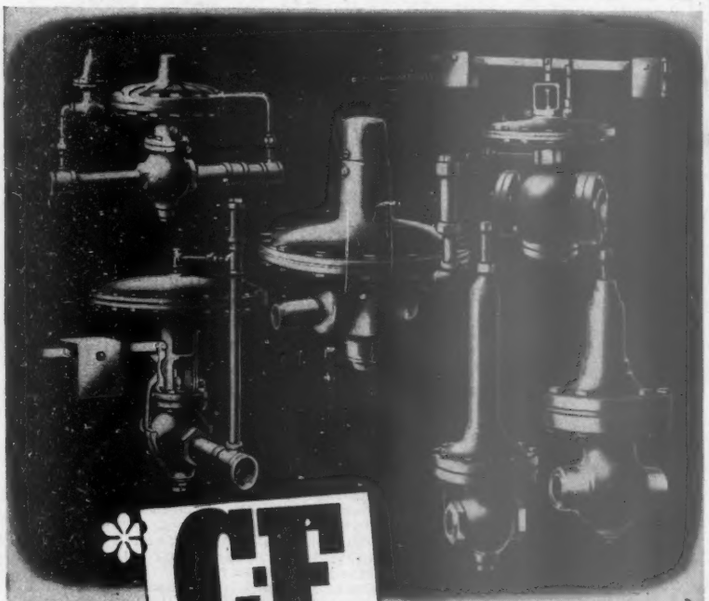
In southern Saskatchewan, Northwest-Radville 1, LSD 16, 36-5-19w2, is preparing to resume after fishing job at 7,958 ft. Test has drilled through both the Madison and Devonian limestones and some 240 ft. into the Silurian, of which 200 ft. was salt formation. It is planned to continue to around 8,500 ft. to test the underlying Ordovician limestone. Showings in the Madison and Devonian will not be tested till drilling is completed. Northwest Co. and associated interests are considering a drilling program for the Blackfoot structure, to be based on information secured in the deep test and in exhaustive preliminary surveys.

Oil Ventures of Regina, who also hold acreage on the Blackfoot structure, are arranging contract with a Calgary company for drilling their first well.

In southeastern Saskatchewan, Bobjo Mines-Alameda 1 is rigging heavy-duty outfit to deepen from the original contract depth of 3,500 ft. to around 4,500 ft. The lighter outfit has been moved to a location south of Carlyle, 35 miles west of Manitoba and 30 miles north of the United States boundary, where oil seepages have been found along Moose Creek.

In western Saskatchewan, in the Muddy Lake area, Unity 1, LSD 8, 14-39-23w3, sponsored by Arthur Kendall and associates of Regina, is deepening below 225 ft. Test is expected to get the lime around 2,130

(Continued on Page 91)



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Mansfield Producer Extends Caborn Field to South

EVANSVILLE, Ind.—John Lindas and Breuil are making a production test on the 1 Edward Seifert, SW NW NE 30-6s-12w, Posey County. The well is south of the Caborn field and encountered saturation in the Mansfield sand at 1,124-54 ft. On a swab test it made 75 bbl. of oil a day.

Also in Posey County, Clark C. Nye will attempt a westward extension of the Mount Vernon field at 1 C. N. Black, NE SE 3-7s-14w. At latest reports, rotary derrick was up for the 1 Black but operations had not yet gotten under way.

In Spencer County, Milo B. Siegel is preparing to drill the 1 Bullock heirs, SE SE NE 33-7s-7w, the west offset to the 1 Ruth Locker, discovery well of the Eureka pool. The well, about 7 miles west of Rockport, will be drilled on a Gulf farmout and will test the McClosky at about 1,650 ft.

INDIANA COMPLETIONS

Gibson County: Continental 56 Maier, NE cor. 1-3s-14w, dry, T.D. 2,918 ft., Ste. Genevieve 2,811 ft., McClosky 2,895 ft.

R. Baldwin 1 Decker, SW SE NE 23-1n-10w, dry, T.D. 1,876 ft., show oil 1,771 ft.

Greene County: Kentucky Natural Gas 1 Dilley, SE SW 17-8n-3w, dry, T.D. 1,270 ft.

Knox County: W. C. McBride 1-A Brevoont, SE NW NE 39-2n-11w, dry, T.D. 1,880 ft., Rosiclare 1,819-39 ft., show oil.

Posey County: Mahutska Oil 1 Holmans, NW NE NW 5-4s-13w, pumped 25 bbl., Cypress 2,480 ft.

C. E. Brehm 1 Handwick, SE cor. 12-8n-14w, dry, T.D. 1,330 ft.

Carter Oil 1 Hancock, NW SW 9-7s-14w, dry, T.D. 2,961 ft., McClosky 2,832 ft., St. Louis 2,954 ft.

Warrick County: K. D. Holland 1 Bender, SW NW SE 35-4s-6w, dry, T.D. 1,300 ft., McClosky 1,188 ft.

OHIO

ZANESVILLE, Ohio.—The Pure Oil Co. 1 James Pargeon, located on the western edge of the Clayton oil pool in Section 12, Reading Township, Perry County, made 1,550,000 cu. ft. of gas and a small showing of oil. The Clinton was logged at 3,187-3,231 ft., total depth was 3,235 ft. A 38-bbl. producer was also reported. Several other tests in the pool are nearing completion.

SOUTHEAST OHIO COMPLETIONS

Athens County, Carthage Township: C. W. Nuzum et al 2 James R. Fish, Sec. 25, dry, second Berea, T.D. 1,775 ft.

Ashland County, Jackson Township: Konrad & Beu 4 H. E. Morr, Sec. 21, 5 bbl., shot, Berea, T.D. 737 ft.

Vermilion Township: Ohio Fuel 1 Grant McCready, Sec. 19, dry, no Clinton sand, T.D. 2,783 ft.

Guernsey County, Cambridge Township: Ronshansen & Ridgeway, Sec. 25, 30,000 cu. ft. gas, shot, Berea, T.D. 1,056 ft.

Wheeling Township: Ohio Fuel 1 Marsh Lumber Co., Sec. 20, dry, Oriskany 3,420-28 ft., T.D. 3,471 ft., top of Corniferous 3,269 ft.

Hocking County, Ward Township: Ohio Fuel 215 Sunday Creek Coal Co., Sec. 3, dry, Berea (water), T.D. 1,079 ft.

Knox County, Jefferson Township: Allen Willey et al 1 J. R. Staats, Sec. 5, 200,000 cu. ft. gas, shot, Clinton, T.D. 2,965 ft.

Monroe Township: H. E. Perkins 1 J. Hardesty, Sec. 10, show gas, plugged, Clinton, T.D. 2,463 ft.

H. E. Perkins 1 A. Hoffman, Sec. 25, dry, Clinton, T.D. 2,492 ft.

Union Township: Ohio Fuel 1 A. G. Watson, Sec. 25, show gas, plugged, Clinton, T.D. 2,391 ft.

Licking County, Burlington Township: S. D. McCloy & Son 1 Patten & Shrider, Sec. 5, 80,000 cu. ft. gas, shot, Clinton, T.D. 2,149 ft.

Lorain County, Columbia Township: Ohio Fuel 1 Kundtz properties, Lot 97, 650,000 cu. ft. gas, shot, Clinton, T.D. 2,737 ft.

Monroe County, Washington Township: Hall & Henning 1 C. Howell, Sec. 23, dry, Injun, T.D. 1,660 ft.

Malage Township: A. C. Peters et al 1 Phillip Zelger, Sec. 28, 30 bbl., Lima, T.D. 1,160 ft.

Morgan County, Marion Township: C. P. Bowman 1 W. Shook, Sec. 13, 100,000 cu. ft. gas, Salt sand, T.D. 1,001 ft.

Muskingum County, Newton Township: Atha Co. 1 George Rusnak, Sec. 14, 330,000 cu. ft. gas, shot, Clinton, T.D. 3,401 ft.

Blue Rock Township: Industrial Gas Corp. 4 Wm. Lilienthal, Sec. 4, 25 bbl., Medina, T.D. 4,494 ft.

Noble County, Seneca Township: S. E. Ruby 1 D. Bates, 50,000 cu. ft. gas, shot, Berea, T.D. 1,707 ft.

Perry County, Clayton Township: Preston Oil 3 Joseph A. Wilson, Sec. 6, 38 bbl., shot, Clinton, T.D. 3,231 ft.

Preston Oil Co. 2 John Wilson, Sec. 5, 60 bbl. Clinton, T.D. 3,260 ft.

Industrial Gas Corp. 2 T. C. Rhodes et al, Sec. 3, 45 bbl., Clinton, T.D. 3,260 ft.

Pure Oil Co. 2 W. Ford, Sec. 6, 50 bbl., Clinton, T.D. 3,242 ft.

Madison Township: Preston Oil Co. 1 Holdeln, Sec. 33, dry, Clinton, T.D. 3,250 ft.

Reading Township: Industrial Gas Corp. 1 Ida Dittoe, Sec. 21, dry, Clinton, T.D. 3,250 ft.

Pure Oil 5 Pargeon, Sec. 12, 1,550,000 cu. ft. gas, show of oil, Clinton, T.D. 3,235 ft.

Tuscarawas County, Sandy Township: Natural Gas of W. Va. 1 Diana Hazlett, Sec. 23, 1,200,000 cu. ft. gas, shot, Clinton, T.D. 4,788 ft.

Wayne County, Plain Township: Dave Shafer 1 M. Houser, Sec. 21, 800,000 cu. ft. gas, Clinton, T.D. 3,265 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—One oil and one gas well were the extent of Kentucky completions the past week, although drilling operations are reported to be showing a slight pickup in one or two counties.

Magoffin County is showing some additional

(Continued on Page 84)

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Arbuckle Lime Forms Second Pay in Henderson Pool

By CARL HOOT

WILDCAT developments of interest in Kansas included a connecting well between the Silica and Chase pools in Rice County, a new pay zone in the Henderson pool of Cowley County and a number of new locations.

New pay for the Henderson pool was Earl Wakefield 1 Campbell, SE SE 22-32-3e, which flowed 70 bbl. of 37.8-gravity oil an hour from Arbuckle at 3,419-24 ft. and made an estimated 24-hour test of 1,680 bbl., pumping and flowing. Mississippi lime was found at 3,108 ft. The pool's one other producing well is in the Lansing-Kansas City, whose production was 170 bbl. in August.

Filling in the gap between the Chase and Silica pools in Rice County, Harwood Oil Co. 1 Proffitt, NE NE NW 25-19-10w, pumped 12 bbl. an hour from Arbuckle at 3,281-90 ft. Gravity of the oil was 40.4.

Lindsborg Pool Has Rapid Growth

The northwest end of the Lindsborg pool in McPherson County gained another Simpson sand producer and a ⅜-mile extension when Bay Petroleum 2 Fagerberg, NE NW 8-17-3w, made initial potential of 2,261 bbl. from the sand at 3,457-68 ft. A quarter of a mile south of this well, M. & L. Oil Co. 2 Hoglund made preliminary tests of 60 bbl. an hour from Simpson at 3,457 ft. Carter Oil Co. was reported to be rigging up for a test of both the Viola and Simpson zones. The well is 1 Rundbeck, W½ SE SW 5-17-3w, and is the most northerly location on the eastern side of the field.

Wildcat First Reports

In McPherson County, 1½ miles southwest of production in the Lindsborg pool, Falcon Seaboard Drilling Co. staked location for the 1 Bengstrom, NW 25-17-4w. A portable rotary outfit has been rigged up. In southern Reno County J. A. Jenkins et al made location for 1 Martin, SE NE 12-26-10w, which will be a Viola lime test, and in SE SE 10-26-7w, northwest of the town of Pretty Prairie, H. M. Williams et al 1 Krehbiel was moving in rotary tools.

KANSAS COMPLETIONS

Wildcats

Atchison County: Hatcher-Fisk 1 Warner, NW SW 19-7-17, dry, T.D. 2,031 ft., Mississippi lime 2,014 ft.

Cowley County, new horizon in Henderson pool: Wakefield 1 Campbell, SE SE 22-32-3, estimated pumped and flowed 1,680 bbl., Arbuckle 3,419-24 ft.

Kearny County: Parker Drlg. 1 Druley, SE SW NW 28-23-37w, dry, T.D. 5,204 ft., Lansing 4,050 ft., Mississippi lime 4,896 ft., show oil 4,000 ft., and 4,934 ft.

Pawnee County: Cities Service 1-B Peters, NE NE SW 29-20-18w, dry, T.D. 4,090 ft., Lansing 3,640 ft., Arbuckle 4,021 ft.

Herndon Drlg. 1 Mickelson, NW SW SW 15-21-18w, dry, T.D. 4,061 ft., Lansing-Kansas City 3,589-3,900 ft., Arbuckle 4,019 ft., porosity 4,036-40 ft.

Reno County: Bay Pet. 1 Keddie, SW NE NE 25-23-10w, dry, T.D. 4,010 ft., Lansing 3,268-3,547 ft., Mississippi lime 3,649 ft., Viola 3,816 ft., Simpson sand 3,926 ft., Arbuckle 3,985 ft.

Helmerich & Payne 1 Tonn, NW NW SE 29-25-5w, dry, T.D. 4,060 ft., Mississippi lime 3,458 ft., Viola 3,887 ft., Simpson 3,910 ft., Arbuckle 4,010 ft.

Rice County: Harwood Oil 1 Proffitt, NE NE NW 25-19-10w, pumped 9 to 12 bbl. an hr., Arbuckle 3,281-90 ft.

Russell County: Herndon Drlg. 1 Kunz, SE SE NW 19-14-15w, dry, T.D. 3,385 ft., Lansing 3,085 ft., Arbuckle 3,365 ft.

Saline County: Veeder Oil 1 Juelfs, NE SW NE 31-15-1w, dry, T.D. 2,760 ft., Kansas City 2,071 ft., Mississipi lime 2,703 ft., show oil 2,721 ft., 2,730 ft., 2,760 ft.

Fields

Albert, Barton County: Vernon Oil & Gas 1 Bird, SW cor. 33-18-15w, dry, T.D. 3,680 ft.

Beaumont, Greenwood County: K. T. Wiedemann 17-A Lewis, NW NE 35-27-8, estimated pumped 200 bbl., Mississippi lime 2,503-12 ft.

Burnett, Ellis County: N. Appleman 3 Carmichael, SW NW NE 11-11-18w, dry, T.D. 3,539 ft.

Chase, Rice County: Bay Pet. 2 DeWitt, SW SE 9-20-9w, pumped 20 bbl., Arbuckle 3,255-60 ft.

Dayton, Phillips County: Carter 3 Dusin, SW SE 35-2-19w, dry, T.D. 3,360 ft.

Dopita, Rooks County: Phillips et al 1 Elsie, SE SW 30-8-17w, dry, T.D. 3,485 ft.

Greenvale, Russell County: Jones & Shelburne 4 Major, NE SW NE 4-15-12w, 522 bbl., sand 3,190-95 ft., T.D. 3,203 ft.

Hall-Gurney, Russell County: R. H. Shields 6 Giese, N½ SE NE 28-14-13w, 1,056 bbl., Lansing 2,903-27 ft.

Iuka, Pratt County: Atlantic Ref. 1 Apperson, NE SW 14-27-13w, dry, T.D. 4,530 ft.

Kraft-Prusa, Barton County: Black-Marshall 2 Riemann, NE SE NE 25-16-12w, swabbed 22 bbl., conglomerate 3,325-28 ft.

C. E. Ash 2 Radenberg, NE NE SE 5-17-11w, 3,000 bbl., Arbuckle 3,317-26 ft.

Shell 2 Barth, NE NE SW 15-17-11w, pumped 583 bbl., Arbuckle 3,264-79 ft., T.D. 3,285 ft.

Shell 2-B Soeken, NE NW NE 21-17-11w, dry, T.D. 3,415 ft.

Lindsborg, McPherson County: Bay Pet. 2 Fagerberg, NE NW 8-17-13w, 2,261 bbl., Simpson sand 3,457-68 ft.

Lost Springs, Marion County: Ring-Mac Oil 1 Kroupa, W½ NW SE 4-18-4, dry, T.D. 2,485 ft.

McLouth, Jefferson County: Sherrod 2 Bower, N½ SW NE 5-10-20, pumped 35 bbl., Mississippi lime 1,643-58 ft.

O. J. Connell 2 Moseberger, NW NE 28-9-20, dry, T.D. 1,452 ft., Mississippi lime 1,420 ft.

McLaughlin 2 Miller, NW SE NE 28-9-20, 2,700,000 cu. ft. gas, sand 1,337-69 ft.

Workman 1 Old Line Insurance, NW SE 28-9-20, 800,000 cu. ft. gas, sand 1,430-40 ft., T.D. 1,470 ft.

McLouth, Leavenworth County: Mosbacher 3 Bell, C E½ SE 1-10-20, 7,000,000 cu. ft. gas, Bartlesville sand 1,384-96 ft.

Peace Creek, Reno County: Helmerich & Payne 1 Lavielle, SE SE 24-22-10w, dry, T.D. 3,796 ft., Viola 3,587 ft., Arbuckle 3,746 ft.

Amerada 1 Bailey, SW SE NE 36-22-10w, dry, T.D. 3,724 ft., Viola 3,684 ft., swabbed 55 bbl. oil and 358 bbl. water.

Trapp, Russell County: Phillips 3 Kramer, SW NW 14-15-14w, swabbed 108 bbl. in 8 hr., Arbuckle 3,338-42 ft.

Phillips 4 Krug, NE SE 15-15-14w, pumped 210 bbl., Arbuckle 3,343-46 ft.

Stanolind 1 Mai, NE SW 22-15-14w, dry, T.D. 3,378 ft.

Witt, Russell County: A. H. Witt 2 fee, SW SE NE 3-15-14w, pumped 231 bbl., Lansing 2,969-99 ft., T.D. 3,013 ft.

NEBRASKA

ST. JOSEPH, Mo.—Cities Service Oil Co. has given orders to abandon and plug its wildcat oil and gas test 3 miles southeast of Tarkio in Atchison County, Missouri. This test, 1 Glenn Gray, SW SW SW 29-65n-39w, was taken to the Hunton lime, which was dry, and then plugged back to Bartlesville sand, in which there had been an oil stain. Results, however, were negative, except for a slight amount of oil along with a great quantity of water.

Two miles north of Sabetha, Kans., in Nemaha County, Clifton Gall of Falls City, Neb., was rigging up to drill 1 Leigh Mills, SE NE 24-1s-14e,

(Continued on Page 85)

Illinois Fields

(Continued from Page 79)

NE SW 6-5n-14w, pumped 76 bbl., McClosky 2,853 ft., T.D. 2,922 ft.

Sims, Wayne County: Texas 3 Warren, W½ NE SW 22-1s-6e, pumped 445 bbl., McClosky 3,192 ft., T.D. 3,212 ft.

South Lawrence, Lawrence County: Moindia Oil 3 Hershey, NW SW SE 27-2n-12w, pumped 174 bbl., Benoist 2,404-09 ft., T.D. 2,504 ft.

Smith & Nye 3 Spidel, SE NE NW 26-2n-12w, dry at 950 ft.

E. O. Olds 2 Van Wey, NE SE SE 23-2n-12w, pumped 145 bbl., Benoist, T.D. 1,385 ft.

Olds 1 Van Wey, SW SE SE 23-2n-12w, pumped 140 bbl., Biehl 1,362 ft., T.D. 1,385 ft.

Stringtown, Richland County: Boles Bros. 1 Petty, NE SW NE 10-4n-14w, pumped 134 bbl., Rosiclare 2,957 ft.

Westfield, Clark County: Da-Vess 1-A Lee, NE SE SW 29-11n-14w, dry at 453 ft.

West Frankfort, Franklin County: E. S. Adkins 4-B Orient, SE SE SW 12-7s-2e, pumped 18 bbl., Aux Vases 2,708 ft., T.D. 2,975 ft.

Permian Basin, Panhandle

(Continued from Page 70)

About 30 miles southeast of Fort Stockton in Pecos County, Phillips 1 Price, Section 11, Block 101, T.C. Survey, was drilling at 4,700 ft. in lime.

SOUTHERN WEST TEXAS COMPLETIONS

Wildcats

Pecos County: Gruber & Ringle 1 University, NE SE Sec. 19, Blk. 16, Univ. Sur., 1½ mi. N of Taylor-Link pool, elev. 2,448 ft., dry, Yates sand 925 ft., brown lime 1,411 ft., T.D. 1,580 ft.

Fields

McElroy, Upton County: T. P. Coal & Oil 3-A Cody Bell, SW NE Sec. 4, J. H. Gibson Sur., elev. 2,825 ft., pumped 73 bbl. oil plus 5 per cent water after shot, pay 2,965 ft., T.D. 3,311 ft., P.B. 3,222 ft.

Walker, Pecos County: Cardinal Oil 2-C University, SE NE Sec. 25, Blk. 16, Univ. Sur., elev. 2,962 ft., flowed 61.5 bbl. through tubing after shot, pay 2,005 ft., T.D. 2,030 ft.

Weiner, Winkler County: Ralph Lowe 10 Brown & Altman, NW SE Sec. 24, Blk. B-5, P.S.L. Sur., elev. 2,830 ft., flowed 240 bbl. through 1-in. tubing choke after shot, pay 3,069 ft., T.D. 3,178 ft.

TEXAS PANHANDLE COMPLETIONS

Fields

Gray County: Magnolia 54 fee, Sec. 14, Blk. 3, potential 130 bbl., shot 2,771 ft., T.D. 2,963 ft.

Hutchinson County: J. E. Crosbie 49 Pitts, Sec. 9, Blk. M-21, potential 176 bbl., shot 2,720 ft., T.D. 2,820 ft.

Goodin & Parton 5 Hodges, Sec. 14, Blk. X-02, potential 49 bbl., shot 2,988-3,093 ft., T.D. 3,096 ft.

J. M. Huber 22 Weatherly, Sec. 26, Blk. Y, potential 112 bbl., acid, T.D. 2,990 ft., P.B. 2,942 ft.

Skelly 3 Merchant, Sec. 34, Blk. 47, potential 43 bbl. oil and 10 bbl. water, acid, T.D. 2,930 ft., P.B. 2,770 ft.

Moore County: Canadian River 3 Read-A, Sec. 15, Blk. B-12, gaged 28,000,000 cu. ft. gas, R.P. 340 lb., acid, T.D. 2,640 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—The Square Lake pool of Eddy County reported three completions for the week, leading the state's activities, in the southeast area. One completion and three starts were also reported for the Grayburg-Jackson pool. Premier Petroleum Corp. 1 Stablein, a wildcat test in 15-16s-30e, 3 miles north of Square Lake, had base of salt at 1,225 ft. and was drilling ahead in anhydrite.

SOUTHEAST NEW MEXICO COMPLETIONS

Arrowhead, Lea County: Gulf 5-C Leonard, 36-21s-36e, flowed 265 bbl., pay 3,715 ft., T.D. 3,800 ft.

Grayburg-Jackson, Eddy County: Aston & Fair 21 Arnold, 26-17s-30e, flowed 60 bbl. in 2 hr., pay 3,172 ft., T.D. 3,250 ft., shot.

Square Lake, Eddy County: Barney Cockburn 8 State, 36-16s-30e, flowed 90 bbl. in 8 hr., pay 2,955-82 ft., T.D. 3,025 ft.

Barney Cockburn 12 Etz, 35-16s-30e, flowed 85 bbl. in 12 hr., pay 3,030 ft., T.D. 3,204 ft., shot.

Evarts Drlg. 5 Grier, 31-16s-31e, flowed 18 bbl., pay 3,229 ft., T.D. 3,256 ft., shot.

Appalachian Fields

(Continued from Page 78)

Sarah Wilson DD, 300,000 cu. ft. gas, Bayard, T.D. 3,270 ft.

Putnam County, Curry district: Yoder Gas Co. 2 Roncie Yoder, 94,000 cu. ft. gas after shot, Berea 2,171-95 ft., T.D. 2,210 ft.

Ritchie County, Grant district: Dr. E. C. Hartman 2 H. F. Andrews, dry, Big Injun, T.D. 1,860 ft.

Murphy district: W. H. Bickle 2 B. F. Welch, 133,000 cu. ft. gas, Big Injun, T.D. 2,023 ft.

ORISKANY GAS FIELDS

Jackson County, Ravenswood district: Columbian Carbon Co. 1 Hutchinson & Boggess, 862,000 cu. ft. gas, natural, Corniferous 4,997 ft., Oriskany 5,110 ft., T.D. 5,151 ft.

Washington district: United Carbon Co. 15 R. E. W. Perkins, 4,500,000 cu. ft. gas, natural, Corniferous 5,009 ft., Oriskany 5,139 ft., gas 5,145-52 ft., T.D. 5,154 ft.

Availability of Gas Pertinent to Study of Supply and Reserves

(Continued from Page 37)

cluded reserves amounted to no more than 3.000 billion cubic feet.

Capacity to Produce Gas

It is now well known to natural-gas men that although a field may contain a very substantial remaining reserve good for 10 or even 20 years' supply at the current rate of gas withdrawal, it is nevertheless something of a problem to secure during the winter months and the days of peak demand the quantity of gas needed for the attached markets. A notable example of this is our Appalachian field in which reserves of 5 trillion cubic feet are more than 12 times the present annual production. Nevertheless, it has required in recent winters and it will require next winter during periods of peak demand that every well be open to maximum production and every horsepower of compressor capacity be in service. The utility serving a natural-gas market must be, if possible, fortified with a substantial reserve of gas and also fortified with a reasonable excess capacity to produce gas. In recent years many of the utilities have found it possible to utilize to an ever-increasing extent gas-storage fields located near their principal markets which aid greatly in the matter of peak delivery capacity. When gas shortages are imminent there is a great tendency to take gas for the immediate need regardless of the eventual consequences. There is an old rule, and it has the backing of law in some states, that the withdrawal of gas shall not exceed 25 per cent (or some other per cent) of the capacity of the well to produce against atmospheric pressure. This figure of 25 per cent has become imbedded in the natural-gas industry due, I believe, only to the fact that it has long been used. There are wells, and many of them, which will not be hurt in the least if the pull on the well be all that the well can deliver. This situation prevails in fields where there is no water drive, known or imminent, and where the producing formation is solid and does not flow with the gas stream. Most of the wells in the Appalachian fields are of this type. Exceptions are present in the Appalachian region, as, for example, in the Tilbury and other fields in southern Ontario. In the Gulf coastal region danger exists if wells in many fields be permitted to even approach a continued delivery of only 15 per cent of their open flow. Wherever the local conditions as revealed by geologic or other studies justify the conclusion that water encroachment is imminent or probable, gas production should be carefully regulated to the end that the greatest ultimate production from the field may be obtained. And it should always be recognized that natural gas, to be available for transport to distant markets, must be available in amounts sufficient to assure longevity to such projects.

Relation of Reserves to Increasing Demand

In my opening remarks I called your attention to the fact that the natural-gas industry has been serving us to some extent at least since prior to 1885. The industry has grown enormously until it has become one of the major industries of this nation. The benefits of natural gas are shared directly by possibly 35 million people in this country and in 34 of our states and the District of Columbia. Indirectly all of our people are benefited. The present annual production has a fuel value equivalent to about 100 million tons of coal or to about 425 million barrels of fuel oil. To maintain this immense and increasing flow of gas it is necessary that conservation in the production of gas and the use of gas be widely practiced. Notable strides to this end have been made. Where necessary, peak deliveries are now met in part by gas stored in depleted fields. In Cleveland, natural gas is placed in storage in liquid form to help meet the peak demand. Today substitute fuels are available at many industrial plants to the end that peak deliveries essential to domestic consumers may be made. Conservation of natural gas has been widely effected. Not only is much less gas now being wasted into the air but in its consumption great improvements in efficiency of use have been made. For example, the carbon-black industry, once considered most inefficient in its use of natural gas, is now using and on an increasing scale new and greatly improved processes, to supplement the channel process. In 1941 the total black made from natural gas in this country amounted to 594 million pounds, and of this 106 million pounds was made by the new processes in which about four to six times as much black is derived from each unit of natural gas as was previously made by the channel process. The plants now under construction in this country will bring about more than double the output of black by the new processes within another year. The importance of this will be more easily comprehended when we realize that more than 90 per cent of the black used in this country is in the manufacture of rubber products and that the carbon-black companies have developed a type of black particularly suitable for use with synthetic rubber in our war effort.

The natural-gas industry is truly a great industry, serving millions in widely scattered localities. Its annual gas delivery is astounding, whether measured in billions of cubic feet or trillions of heat units. Its proven reserves are also great in amount. And the potential reserves are, I am confident, also truly great in amount.

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Ickes Lauds Oil Industry in Talks at A.I.M.E. Meeting

(Continued from Page 25)

Out of the present 20,000,000,000-bbl. national oil reserve the industry is producing about about 4,000,000 bbl. daily, according to Mr. Ickes, and this cannot be reduced because of the necessary production of 100-octane gasoline, toluene, butadiene, and fuel oil. But this doen't mean we have 14 years' supply because of the time element in producing the oil.

"If all the wells in this country were opened to their absolute physical capacity," the coordinator said, "we could probably produce about 15,000,000 bbl. in the first 24 hours."

Such an abuse of the reservoirs, he said, would make the production decline rapidly and it would be "only a matter of a few days before the country's output would be down to 6 or 7 million barrels. And within a very few months the wells would be incapable of producing at the present restricted rate of 4,000,000 bbl. per day."

Fortunately, Mr. Ickes said, oil men of the type which would abuse present fields are in the rapidly decreasing minority.

"Oil safely reposing in the ground is like money in an unbreakable bank," he declared. "Except by the foolish, it is not to be taken out and squandered, but kept there to be drawn on as needed. The oil industry as a whole has become farseeing and is patriotic in its realization—and acceptance—of the fact that oil is ammunition. This attitude on the part of the industry has simplified the enormous and complicated task of the Office of Petroleum Coordinator. Indeed, the industry as such, has set an example which every other industry, and every individual might well look for inspiration and guidance."

Mr. Ickes summarized the situation by remarking that insufficient reserves, and the lack of encouraging discoveries during the past few years made exploration extremely necessary and that it should be encouraged. After the needed new fields are discovered, he pleaded, let us develop them on the basis of scientific conservation.

The coordinator was introduced by John R. Suman, vice president, Humble Oil & Refining Co., Houston, Tex., who briefly remarked that the oil industry was glad to give its cooperation to the petroleum coordinator, particularly after Mr. Ickes' remark of a year ago to the effect that after the war was over, he'd gladly turn the management of the industry back to the oil men.

Scrap Requirements Discussed

The only other general talk at the meeting was on the necessity for gathering in the scrap materials, particularly iron and steel, by R. E. Snoberger, conservation division of WPB. The country needs badly about 17,000,000 tons of scrap and only 11,000,000 or 12,000,000 tons are in sight, according to Mr. Snoberger. At the present time there is only a 30-day supply of scrap material and some mills are running on a day-to-day basis. On a recent occasion, the arrival of several car loads of scrap from the oil fields prevented one Chicago steel mill from shutting down.

WPB wants a scrap pile which will continue steel operations at capacity for about 50 days and this scrap should be gathered immediately before snow or bad weather hides it or prevents collection. As the war progresses, the demand for steel increases, the speaker said, and pointed to one case where the requirements of one item went up 300 per cent in 3 months.

Aggravating the situation is the fact that most of the steel is going into one-way products, which may be lost on the battlefields and not returned to normal scrap channels. Personally, said the speaker, "I hope every piece of steel is eventually lodged in a soft body where it will be hard to recover."

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Mortimer Kline Joins Legal Staff of Oil Coordinator

WASHINGTON, D. C.—Mortimer Kline, Los Angeles, Calif., an oil attorney, has been named associate chief counsel in the Office of Petroleum Coordinator for War.

Mr. Kline comes to OPC with 15 years of general legal practice which included experience in all phases of the petroleum industry. Probably he is best known in oil circles for his work in a series of cases which halted the practice of crooked hole oil drilling.

Mr. Kline is a graduate of Stanford University (1921), and completed his legal education at the University of Southern California.

Among the many independent oil groups which he has represented are Kern Oil Co., the British American Oil & Petroleum Co., Ltd., Hancock Oil C., Bell & Loffland, Inc., and Ventura Land & Water Co.

Rail Shipments of Oil Slump Slightly From All-Time Peak

WASHINGTON, D. C.—Tank-car shipments of oil into the East Coast averaged 835,530 bbl. daily for the week ending September 28.

This was a decrease of 2.5 per cent, or 21,180 bbl., compared with the volume moved in the preceding week, when car loadings reached the all-time high of 856,710 bbl. daily.

In shipping 835,530 bbl. daily to the Atlantic seaboard, 39 companies loaded 27,851 cars. On the basis of an average of 210 bbl. per car, these cars carried an equivalent of 5,848,710 bbl. of petroleum and petroleum products during the week.

NORTH LOUISIANA, ARKANSAS

Field Activity Off at Midway and El Dorado

SHREVEPORT, La.—While North Louisiana field operations are holding fairly steady, activity in the Midway and El Dorado fields of Arkansas have been slow for several weeks.

In the New London-Strong area of southeastern Union County, three wells were reported in progress. Marine Oil Co. 2 Walton, SE NW 13-18s-12w, was below 6,100 ft. in search of lime production and at that depth had run Schlumberger test but no results were announced. A 40-acre location northwest of the 2 Walton, the same company was drilling below 5,200 ft. at the 1 Harper. The other active well in this area is C. H. Lyons 1 Agerton, SW SW 12-18s-12w, which was drilling below 4,400 ft. Three locations were announced for the field during the week.

Two permits for new oil wells in Arkansas were issued from the El Dorado office of the Arkansas Oil and Gas Commission. These were C. D. Ragsdale 1 Longino-Talley, SW cor. 11-18s-19w, Columbus County; and Berry Asphalt Co. 1 fee, SW SW NE 5-14s-20w, in Nevada County.

Good progress was reported during the week on the two wildcat tests which are under way across the Ouachita River in Calhoun County. Skelly Oil Co. was drilling below 2,000 ft. at 1 Calion Land & Lumber Co. in 27-15s-14w, east of Snow Hill and between the towns of Calion and Hampton in 28-14s-14w. H. L. Hunt started work on 1 Furlow.

ARKANSAS COMPLETION

Wildcat, Ouachita County: North Central Texas Oil Co. 1 Fort Smith Timber & Land Co., NW NW 15-12s-17w, dry, T.D. 3,505 ft.

NORTH LOUISIANA COMPLETIONS

Wildcat, Catahoula Parish: Placid Oil 1 Burroughs, SE SE 34-7n-6e, dry, T.D. 6,697 ft.

Wildcat, Red River Parish: Cryer & Reese 1 Stephens, SE NW 27-12n-9w, dry, T.D. 3,400 ft.

Caddo, Caddo Parish: Bering Oil 1 Hurdle, NE NE SE 34-22n-16w, flowed 150 bbl., pay 2,410-16 ft., T.D. 2,457 ft.

Dixie, Caddo Parish: Sibley Oil 1 Sibley, NW NE NW 15-19n-14w, pumped 10 bbl., pay 2,445-2,506 ft.

Monroe, Morehouse Parish: Southern Carbon 39 Tensas, SW SW 23-22n-4e, 11,440,000 cu. ft. gas, sand 2,149-2,230 ft.

Monroe, Union Parish: N. & W. Corp. 1-A Union Producing, C W½ 6-21n-4e, 10,603,000 cu. ft. gas, sand 2,097-2,210 ft.

Interstate Natural Gas 118 fee, 1,320 ft. N of SW cor. 24-21n-3e, 12,668,000 cu. ft. gas, sand 2,109-80 ft.

Interstate Natural Gas 119 fee, 1,320 ft. S of NW cor. 19-21n-3e, 13,673,000 cu. ft. gas, sand 2,100-81 ft.

Claiborne Parish: Big West Drlg. 1 Mitchem, C W½ 12-21n-4e, dry, T.D. 5,300 ft.

Tensas Parish: Carter Oil et al 1 State-476, 15-9n-10e, dry, T.D. 6,553 ft.

ALABAMA COMPLETIONS

Winston County, near Haleyville: G. L. Reaser 1 J. J. Henderson, NW NE 30-9s-10w, dry, T.D. 3,128 ft.

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West Central Texas Fields

(Continued from Page 75)

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Coleman County: Anzac Oil Corp. et al 1 L. V. Edgton, Victoria Co. Sch. Ld., dry, T.D. 2,765 ft.

Jones County: Cardinal et al 1 P. Williamson, Sec. 31, Blk. 18, T.&P. Sur., 39 bbl. in 2 hr. through ⅝-in. tubing choke, gas-oil ratio 175 to 1, sand 3,080-84 ft., T.D. 3,084 ft.

Palo Pinto County: W. K. Gordon et al 1 Mrs. J. W. Conway, Lot 11, Burleson C.S.L. Sur., dry, T.D. 3,640 ft.

Shackelford County: R. H. Roark et al 1 W. H. Green, Sec. 49, Blk. 12, T.P. Sur., dry, T.D. 4,760 ft.

Stephens County: Fleming Oil Co. et al 4 J. Q. Corbett, Sec. 4, A. W. Corbett et al Sur., Abst. 971, pumped 21 bbl. after 500 gal. acid, lime show 4,548-55 ft., T.D. 4,555 ft., *discovery*.

Fields

Akard, Jones County: Merry Bros. & Perrini 2 J. A. Collins, Lot 14, G. Martinez Sur., dry, T.D. 2,169 ft.

Cook, Shackelford County: Roeser & Pendleton and Continental 8-A W. I. Cook, Sec. 117, E.T. Sur., dry, T.D. 1,546 ft.

Roeser & Pendleton and Continental 17-A W. I. Cook est., Sec. 49, Blk. 12, T.&P. Sur., T.D. 1,566 ft.

Novice, Coleman County: Anderson-Prichard 3 O. B. Featherstone, Sec. 52, Blk. 2, G.H.&H. Sur., flowed 315 bbl. through ½-in. tubing choke natural, gas-oil ratio 900 to 1, gravity 42, pay 3,039-42, 3,051-63 ft., T.D. 3,063 ft.

Eastern Kentucky

(Continued from Page 81)

activity with Cumberland Petroleum planning to drill to the Corniferous at 54 L. C. Bailey. Bed Rock Petroleum is drilling ahead at the 14 Patton Boarders land.

EASTERN KENTUCKY COMPLETIONS

Magoffin County: L. C. Bailey 13 Patten Borders tract at Falcon, pumped 12 bbl. a day.

Floyd County: Kentucky-West Virginia Gas Co. 662 Joe H. Hall, Right Beaver Creek, flowed 119,000 cu. ft. of gas, T.D. 2,780 ft. in shale.

Jesse Pool Extended One Mile to Northeast

By CARL HOOT

FIELD activity in Oklahoma over the past week has been varied. In the Liberty pool of Noble County, where a number of wells have been dry, Deep Rock brought in the second good producer from a shallower sand than the discovery. No. 2 Schultz, SE SW 9-22n-2e, a southwest offset to the 1 Schultz, found Wilcox sand at 4,489 ft., was drilled to 4,825 ft. and then plugged back to 3,150 ft. A sand pay at 2,374-83 ft. produced 123 bbl. of 40-gravity oil a day. The 1 Schultz is producing from the second Wilcox at 4,508 ft.

Wildcats Active

In Coal County, about 1 mile northeast of the Jesse pool, W. A. Delaney 1 Gipson, SW SE NE 7-1n-8e, was reported to be flowing 40 bbl. of oil an hour through tubing from Hunton lime at 3,715-26 ft. after acid treatment. Sunray Oil Co. 1 Welch, on the outskirts of Guthrie in Logan County, has not been officially completed as yet but has had a number of production tests over the past several weeks. Oil from the well has been trucked to Continental's pump station, the total amount produced to September 22 being in excess of 2,800 bbl. Latest reports show the casing ripped from 5,600-09 ft. and 5,649-56 ft. and flowing production of 840 bbl. in 24 hours.

In southeastern Noble County, Kubat et al 1 Tyer, NE NE SW 7-21n-3e, had a good show of oil in Mississippi lime from 4,028-60 ft., but after acid treatment the well caught fire and burned the rig and tools. Operators were preparing to clean out and install pumping equipment.

OKLAHOMA COMPLETIONS

Wildcats

Garvin County: Sinclair Prairie 1 Reed, SW SE NE 21-3-3, dry, T.D. 3,223 ft., McLish 2,395 ft., sand 2,506 ft., Oil Creek 2,644 ft., Joins 2,940 ft., Arbuckle 3,074 ft.

Jefferson County: Tom B. Medders 1 Trout, NW NW NE 6-8s-7w, dry, T.D. 2,250 ft.

Lincoln County: Wilcox 1 Howell, NW SE SE 14-17-3, dry, T.D. 4,549 ft., Viola 4,438 ft., sand 4,504-07 ft.

McIntosh County: Reese Drlg. 1-A Rosseter, SW SE 17-11-14, dry, T.D. 3,307 ft., Cromwell 2,597-2,654 ft., Hunton 3,165 ft., Viola 3,246 ft., show oil in Wilcox 3,288 ft.

Okfuskee County: British American 1-A Community, SW NW SW 12-11-9, dry, T.D. 4,139 ft., Wilcox 4,077 ft., second Wilcox 4,108 ft.

Malarnee Oil 1 Lucas, SW SW NW 8-11-8, dry, T.D. 3,704 ft., Cromwell 3,690 ft., swabbed some oil with considerable water.

Payne County: Gardner Pet. 1 Lowe, NE cor. 31-19-1, dry, T.D. 5,161 ft., Viola 4,997 ft., Wilcox 5,069 ft., second Wilson 5,155 ft., show oil.

Pottawatomie County: H. L. Berkey 1 Reynolds, SW SW 4-11-6, dry, T.D. 3,281 ft., Prue 3,073-3,125 ft.

Fields

Apache, Caddo County: Amerada 2 To-Who, NE SW SW 2-5-12w, flowed 367 bbl. in 9 hr., Wilcox 3,917-64 ft.

Big Pond, Creek County: Malarnee Oil 3 Roundtree, SE SW NW 2-14-7, flowed 8 bbl., Bartlesville 3,105-45 ft., T.D. 3,152 ft.

Chandler, Lincoln County: Dunnett et al 1 Ashton, NE SE 3-14-3, 5,000,000 cu. ft. gas, Oswego 4,025-39 ft., spray oil, R.P. 1,575 lb.

Crescent, Logan County: Sinclair Prairie 2 Short, SW SE NE 27-17-4w, flowed 791 bbl. in 21 hr., Layton 4,924-54 ft.

Konawa, South, Seminole County: American Oils 1 Swan, SW NE SE 3-5-5, pumped 20 bbl., pay 2,085-95 ft., T.D. 2,797 ft.

Liberty, Noble County: Deep Rock 2 Schultz, SE SW 9-22-2, pumped 123 bbl., pay 2,374-83 ft., T.D. 4,825 ft., P.B. 3,150 ft.

Deep Rock 1-B Schultz, NW NW NE 16-22-2, dry, T.D. 5,545 ft., Wilcox 4,501 ft., second Wilcox 5,529 ft.

Loco, West, Stephens County: Brown-Lance 2 Lowery, NE SW NW 8-3s-5w, flowed 34 bbl., pay 1,053-71 ft., T.D. 1,175 ft.

Vernon, Kay County: Seibolt, Morgan et al 1 School Land, S½ NW SW 16-29-1, pumped 51 bbl., Mississippi chat 3,897-3,463 ft.

Miscellaneous

Creek County: Gulf 25 Rhodes, NW NE NW 21-17-12, pumped 32 bbl., sand 1,403-1,531 ft., T.D. 1,542 ft.

Joseph Davis 1 Doty, SW SE 1-18-7, pumped 5 bbl., sand 2,649-51 ft.

Foundation Oil 1 Taylor, NW NW 11-14-7, flowed 10 bbl., Prue 2,624-57 ft., T.D. 2,663 ft., 4,000,000 cu. ft. gas, R.P. 1,040 lb.

A. J. Peters 1 Lumm, NE SW SE 8-14-8, 12,000,000 cu. ft. gas, Prue 2,418-41 ft., R.P. 1,020 lb.

Osage County: Barnsdall 18, SE SW 17-23-12, pumped 25 bbl., Bartlesville 1,563-86 ft.

Nebraska Fields

(Continued from Page 82)

on a farmout from Phillips Petroleum Co.

Nebraska Producing & Refining Co. 1 John Buchholz, W½ NW NW 6-2n-17w, Richardson County, southeast of the Barada pool, was drilling below 2,400 ft. and nearing the Hunton lime. M. J. Sullivan 1 William Beason, E½ SE SW 21-6n-13e, Nemaha County, Nebraska, had a bit stuck in the hole at 2,700 ft. This test is ½ mile southwest of Brock.

NEBRASKA COMPLETIONS

Nemaha County: George Harris 1 Beason, NE NE 20-6n-13e, location abandoned.

Richardson County: S. J. Brown 1 Meyer, W½ SW SE 24-1n-15e, dry, T.D. 902 ft.

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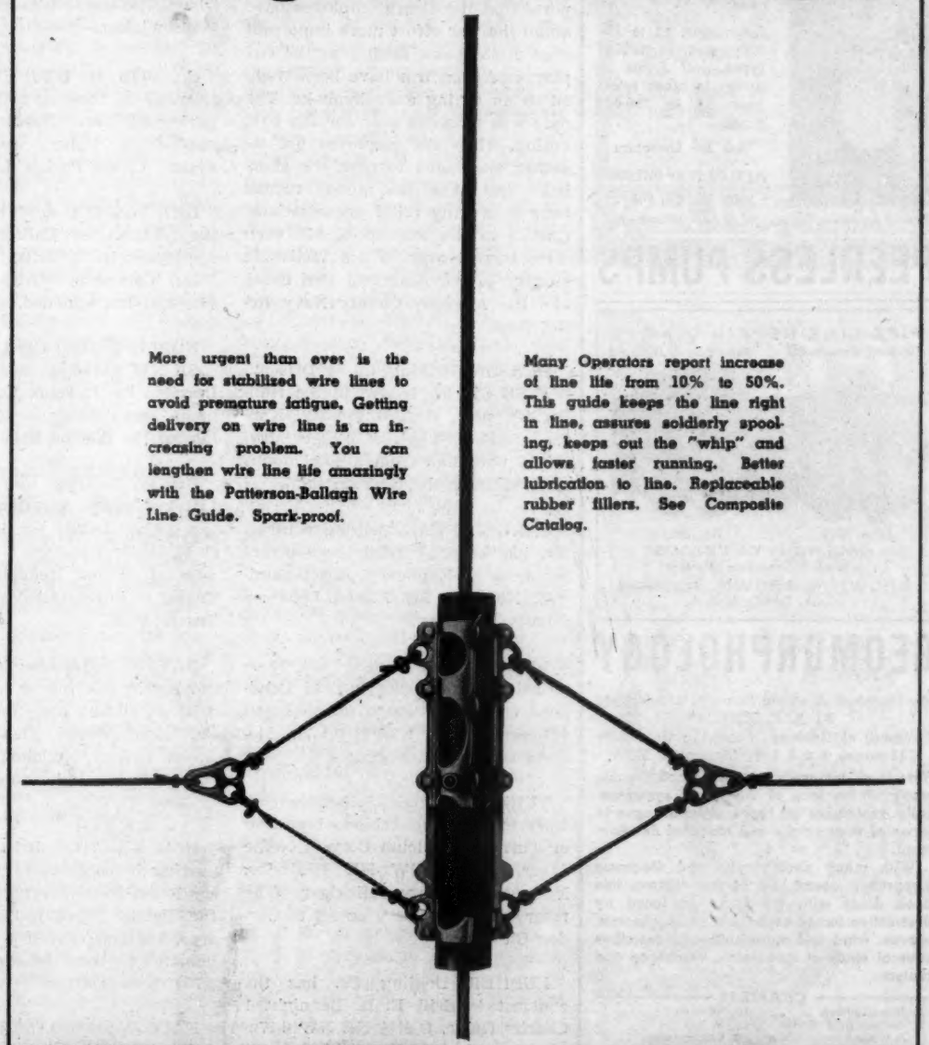

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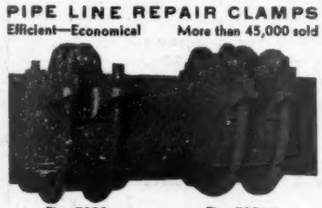

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CHAPTERS

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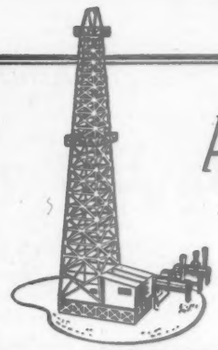
20. Meteor Craters

Book Department
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma



Among the Drilling

COMET Drilling Co. 1 Schart, NE SE 12-20-12w, the Ellinwood area, Barton County, Kansas, was rigging up tools last week.

PENROD Drilling Co. has been awarded contract for Placid Oil Co. 1-B Tremont Lumber, SW 10-9n-1e, a wildcat location in Grant Parish, Louisiana.

HARTER & MITCHELL, drilling contractors in the Appalachian oil and gas fields, Wellsville, N. Y., reports that the firm's employes have voted the war effort more important than a clambake. Each year the employes of this firm have been treated to an outing and clambake. The date was drawing near for the 1942 outing. Then the employes got together and voted to omit the clambake and have the money turned over to worthy relief organizations. Checks in the amount of $75 each were turned over to the Wellsville chapter of the American Red Cross and the Allegany County Navy Relief fund.

BENSON Drilling Co. 2 Driscoll, NW SE SW 27-14s-14w, in the Hall-Gurney pool, Russell County, Kansas, made 630 bbl. of oil per day, initial potential, from a total depth of 3,242 ft. in the Gorham sand.

CARL J. NEAL, drilling contractor, has been awarded the contract for Jesse L. England 1 Roger Dunigan, NE NW SE 7-7s-1e, Lenawee County, Michigan.

LESLIE T. BARBER has been awarded the contract to drill Belvidere Oil Co. 1 State of Michigan (Community), C NW 11-16n-7w, Mecosta County, Michigan.

TURNER Drilling Co. has the contract to drill the cable-tool portion of Turner Petroleum Corp. 1 Nellie Jager, C N½ NW NE 15-21n-7w, Missaukee County, Michigan. The rotary contract has been let to Gordon Oil Co.

LUPHER Drilling Co. has the contract to drill E. L. Bennight 1 Charles Gable, C N½ NE NW 6-17n-10w, Osceola County, Michigan.

E. V. HILLIARD has been awarded contract to drill Mogul Oil Co. C-1 State, C S½ SE NE, 34-21n-3w, Roscommon County, Michigan.

PARKER Drilling Co. has the contract to drill J. W. Dutton et al 1 Bristol, C NW SW 9-1n-2e, Murray County, Oklahoma, wildcat, hole for which was at 2,700 ft. where continued shows of oil and gas were reported. The test is contracted for 3,500 ft. or the Arbuckle section. Magnolia Petroleum Co. et al are supporting the test.

E. C. JOHNSON, Longview, Tex., has the drilling contract for a test Milton J. Houston and Ted Weiner, of Shreveport, La., have started in NE 6-23n-5w, Claiborne Parish, Louisiana. The test, 1 Wilson, is a Travis Peak wildcat.

CLAUDE M. BAGLEY has been awarded the contract and has started Bering Oil Co. 2 Hurdle, in NE 24-22n-16w, a Paluxy sand test at Vivian, Caddo Parish, Louisiana.

DANCIGER Oil & Refining Co. has the contract for California Co. 3-A Applegate, in 13-9n-10e, at Lake St. John, Concordia Parish, Louisiana. The test has spudded.

NOBLE Drilling Co. 1 Gregory, in C SE NW 36-1s-24w, southwest of El Dorado, in Jackson County, Oklahoma, was drilling at 4,748 ft., looking for the Canyon lime.

DELTA Drilling Co., Shreveport, La., has spudded 1 Gentry, wildcat test being drilled for itself in the C. M. Walters Survey, 3 miles southwest of Athens, Henderson County, Texas. It is scheduled to go to the Travis Peak.

BRYAN Petroleum Co., Tulsa, is moving in a string of cable tools to drill a wildcat test for Burns Oil Co. near Boggy Depot, western Atoka County, Oklahoma. Location is in 18-3s-10e. It is proposed to drill to 3,800 ft.

R. B. KIRCHER, Bristow, Okla., is moving in cable tools for a Wilcox sand test for Hervert Gussman on the Eglate lease, 15-14n-9e, Newby area, southern Creek County, Oklahoma. The sand is expected from 3,750 ft. to 3,800 ft.

FALCON-SEABOARD Drilling Co., Tulsa, is starting 1 George B. Bengstrom, in 25-17-4w, 1½ miles southwest of the Lindsborg pool, McPherson County, Kansas. Surface hole is being drilled with a portable rotary rig.

EVARTS Drilling Co., Dallas, Tex., has completed another well for its own account in the Square Lake pool, Eddy County, New Mexico. The well, 5 Grier, flowed 18 bbl. daily with pay at 3,229-56 ft.

HARRY L. EDWARDS Drilling Co., Houston, Tex., has received contract from Pan American Production Co. for another test in the Port Barre field, St. Landry Parish, Louisiana. Rig is being moved in. This contractor reports four other operations, all in Texas, as follows: One for Pan American in the Gillock pool, Galveston County; another for Mid-States Oil Co. in the Esperson field, Liberty County; a third for Continental Oil Co. in the St. Charles field, Aransas County, and the fourth for Fidelity Oil & Royalty Co., in the Mayo field, Jackson County.

FRANK GRAVIS, Corpus Christi, Tex., drilling for Taylor Refining Co., apparently has opened a new sand in the Cadena field, Duval County, Texas, as the result of recovering pipe-line oil on a drill-stem test at 4,500 ft. in 1 Garcia. Previous production in this field has been at 5,200 ft.

BREWSTER-BARTLE Drilling Co., Houston, Tex., is retesting Ohio 1 McDonald after the well showed for a gas-oil ratio producer when tested through perforated casing at 7,800 ft. In the meantime, drilling continues on two wildcats in Montgomery and Tyler counties for George W. Strake and Dishamn & Lucas.

GREY & WOLFE, Houston, Tex., drilling for the La Gloria Corp. in the Magnolia area, Montgomery County, Texas, have reached a depth of 10,901 ft. in 1 Grogan-Cochran Lumber Co. The well is in the A. Prather Survey.

COMPLETE Oil Well Service Co., Houston ,Tex., is moving rig to the La Blanca field, Hidalgo County, Texas, for a workover job for McCollum et al of Houston. In the meantime, drilling continues in the Sarco area, Goliad County, Texas, for Ginther, Warren & Ginther, of Houston.

B. A. DUFFY, Abilene, Tex., is moving tools from Fort Stockton, Tex., to the Willie Wilkinson ranch in northwestern Menard County, Texas, for a scheduled Ordovician wildcat for Al Tolbert of Chicago, in Section 55, J. H. Gibson Survey A-290. Location is 8 miles south and

Contractors

1 mile east of Duffy 1 Robert Wilson, in southwestern Concho County, Texas, an active test. Contract is for 4,000 ft.

R. E. KENNEDY, Kilgore, Tex., has been given contract for H. H. Temple (Shreveport, La.) 1 W. A. Barnes, M. Lindsey Survey, a 4,000-ft. Woodbine sand wildcat 10 miles northwest of Marshall, western Harrison County, Texas.

GILGER Drilling Co., Houston, Tex., is moving in rig for Roy L. Fisher 1 Auguers, a Travis Peak wildcat on the east flank of the big Waskom structure, in Caddo Parish, Louisiana.

GEORGE P. LIVERMORE, Fort Worth, Tex., will drill E. M. Wahlenmaier (San Angelo, Tex.) 1 Mrs. Frankie Thompson, Section 75, Block TT, T.C. Survey, ¼ mile south of Hulldale on the Santa Fe Railroad, Schleicher County, Texas. George Callihan, Abilene, will spud to about 500 ft. with cable tools and set 10-in. casing before rotary is moved in.

LOUIS CROUCH, Houston, Tex., extended production in the Mayo field, Jackson County, Texas, about 3,000 ft. east with the completion of his 1 A. A. Lundy. Completion was made in the 5,300-ft. sand. The rig is expected to be moved several hundred feet south of the producer for 2 Lundy.

SMITH BROTHERS Drilling Co. has set surface pipe in the wildcat test it is drilling on the Billington lease in 22-9n-4e, Hotulke area, Pottawatomie County, Oklahoma.

IRON Drilling Co. is the contractor on the wildcat test being started by Keener Oil & Gas Co. on its Lagree lease, in 6-22-1w, south of Graber, Harvey County, Kansas.

•

OPA Emphasizes Intention To Place Ceiling on Drilling Prices

The Dallas, Tex., office of the Office of Price Administration has further emphasized its intention to place contract oil-well drilling under provisions of the general maximum-price regulation. The American Association of Oilwell Drilling Contractors late last week received a letter from the Dallas regional attorney stating that he realized that "occasional" problems will arise in determining a proper ceiling for the drilling of wildcat wells. He added that each man's highest price last March was his own ceiling, and that would be the governing factor for prices in any given area.

•

Contractors Program Will Be Streamlined

The second annual meeting of American Association of Oilwell Drilling Contractors, to be held in Tulsa, November 19 and 20, will be featured by a streamlined program designed to discuss problems now confronting the drilling industry.

The first day's sessions will be devoted largely to committee meetings and an open session at which contractors will be able to speak in an informal manner. The second day will be devoted to papers and addresses on current industry problems. Two or three nationally known persons will appear on the program.

•

Large Field Force Will Aid in Nation's Dormant-Scrap Drive

A NATION-WIDE INDUSTRIAL "dormant-scrap drive," has been organized by the Conservation Division of the War Production Board.

Seventy thousand industrial executives will be contacted by the salvage section of the Conservation Division. They will be asked to make an inventory of all dormant-scrap materials and to make a complete disposal of all these materials through regularly organized scrap dealer channels as rapidly as possible.

Dormant scrap is defined as obsolete machinery, tools, equipment, dies, jigs, fixtures, which are incapable of current or future use in the war production effort because they are broken, worn-out, irreparable, dismantled or in need of unavailable parts necessary to practical reemployment. Dormant scrap should not be construed to apply to reusable machinery, equipment, dies, jigs, or fixtures, which can currently or in the future be used by the owner or others, with or without repairs, in work which contributes directly to the war production effort.

The field force of the industrial salvage section has been doubled and now comprises 140 men. However, in order to complete successfully this "dormant-scrape drive," the regular field staff has been supplemented by 2,500 volunteer salesmen and sales executives, who have been certified to serve as temporary field men of the industrial salvage section during this special drive.

These salesmen have been drawn from the sales staffs of all the major steel companies, the American Steel Warehouse Association and the Associated Equipment Distributors. Through the active participation of sales executive organizations in most of the larger cities, hundreds of sales executives and salesmen will be coordinated into service in all WPB areas to aid in this program. Operation of this program has been organized by the industrial salvage section, under Hamilton W. Wright through the regional chiefs of the WPB, and the American industries salvage committee, which is headed by Robert W. Wolcott.

Continuous production from open-hearth and electric furnaces and other users of scrap during the winter months of 1943 is dependent on the collection of 7,000,000 additional tons of iron and steel scrap prepared for delivery to the mills for use during the winter months.

Accordingly, top executives of all industrial plants are being urged to:

1. Instruct the salvage executive of their plant, together with other necessary executive officials, to inspect all areas of their plant to determine what salvable items falling in the above-dormant scrap classification can be scrapped.

2. Mark clearly each such item for quick identification and make a list in duplicate, for their own use, in order that plant management may authorize the disposition of each item. Indicate approximate weight opposite every piece of dormant scrap.

3. Arrange immediately to dispose of all dormant scrap.

The Government's grave responsibility to supply American armed forces with ships, guns, airplanes and tanks, necessitates the adoption of this scrap program. The suggested policy by the industrial salvage section to industry with regard to the spotting and disposal of dormant scrap is as follows: "If it hasn't been used for the last 3 months, and no one can prove it can be used in the next 3 months find a use for it or scrap it."

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Personal Paragraphs

DEL CROSBY, scout for Humble Oil & Refining Co., Houston, Tex., has been elected president of the Texas Gulf Oil Scouts Association. E. M. PINCKARD, Pure Oil Co., has been elected vice president; M. S. BROOKS, JR., Standard Oil Co. of Texas, treasurer, and PAUL EDMAN, Tide Water Associated Oil Co., editor of the Year Book. L. D. SCHEWANECKE, Ohio Oil Co., was appointed a member of the national nominating committee.

J. H. JENNINGS, former engineer for Sunray Oil Co., Tulsa, is now with Mountain Fuel Supply Co., Rock Springs, Wyo.

EDWARD J. FOLEY has returned from Cairo, Egypt, where he was with Standard Oil Co. of Egypt. He is now in Butte, Mont.

MAJ. ALBERT FINSTON, independent producer of Tulsa, has recently been assigned to the port of embarkation in New York City.

DONALD BELL, of the staff of the U. S. Tariff Commission, and at one time with Tide Water Associated Oil Co., was a recent visitor in Tulsa.

DON W. JOPLING is leaving the employ of Lago Petroleum Corp., Maracaibo, Venezuela, to return to the United States where he will join the armed forces.

HARRY D. CAMPBELL, former Colorado School of Mines student, has been employed by Stanolind Oil & Gas Co., Ellinwood, Kans., as apprentice engineer.

RAYMOND L. B. KELSCH has left his position with Superior Oil Co., Fresno, Calif., as surveyor, and has volunteered for work with the Naval Construction Corps.

JACK JUDY, Superior Oil Co., Los Angeles, Calif., discussed the latest developments in isobutane extraction at the latest monthly meeting of the Taft, Calif., chapter of the California Natural Gasoline Association.

HERMAN HURST, wildcatter of Oklahoma City, Okla., purchased recently a 1,100-acre ranch in Bowie County, East Texas, and planned to raise cattle. The other day he made a visit to the ranch and learned that a wildcat was drilling nearby.

DONALD M. DAVIS, chief geologist in the Gulf Coast division for Pure Oil Co., Houston, Tex., has been elected president of the Houston Geological Society. Other officers elected include CARL RICHARDSON, Barnsdall Oil Co., vice president; W. L. HORNER, Core Laboratories, secretary; WILLIAM W. CALOHAN, geologist for British American Producing Co., treasurer; JOHN C. MYERS, independent geologist; W. B. MILTON, JR., Gulf Oil Corp., and W. B. MOORE, Atlantic Refining Co., members of the advisory council.

HENRY N. GREIS, president, Deep Rock Oil Co., Tulsa, has recently had an ancient horse-drawn enclosed family coach repainted and refurnished. The coach was received as a gift by Mr. Greis 25 years ago in Buffalo, Okla., when he owned several horse shows. The buggy is estimated to be 60 years old. Mr. Greis has not said what he expects to do with the vehicle, except to hint that it may be used to ride back and forth from his office.

WALTER L. FAUST was elected a vice president of Socony-Vacuum Oil Co., Inc., late in September. Mr. Faust joined Vacuum Oil Co. in 1929 and became manager of the marine sales department, and later of Socony-Vacuum. In 1935 he added to his responsibilities the direction of the company's aviation sales. In 1938 Mr. Faust was appointed eastern sales manager in charge of Socony-Vacuum operation in the eastern part of the United States.

Do You Remember?

From The Oil and Gas Journal Files

35 YEARS AGO

President Roosevelt has announced that he will approve the constitution of the new State of Oklahoma. This means that oil men operating in Indian Territory and Oklahoma had better organize at once to fight the taxation measures that inevitably will be aimed at the petroleum industry.

Eighty-one producing wells were completed in the Glenn field in September, furnishing some 30,000 bbl. of new oil, or an average of 370 bbl. to the well, and making the total number of producing wells in the field 796, having an estimated capacity of about 100,000 bbl., or 126 bbl. to the well.

A 72-ft. derrick, made of solid mahogany, is being used to drill a test for oil by Cuban-American Oil Co. in the Province of Santa Clara, central portion of the Island of Cuba. Timbers were hewn from logs nearby.

25 YEARS AGO

The Osage Council has passed a resolution granting leases on 1 million acres of lands located in the western portion of Osage County, Oklahoma, to a number of capitalists who promised to expend immense sums in development work within the next year.

Oil prospects are not worrying the large number of oil men in attendance at Chicago of the Independent Oil Men's Association. The future looks promising to them, notwithstanding uncertainties as to prices and war regulations.

The Mid-Continent Oil and Gas Association will be organized in Tulsa on Saturday evening at a meeting of oil producers to be held at Hotel Tulsa. The association's purpose is to promote the interests of the oil industry in all its phases, and to protect it from unjust legislation.

15 YEARS AGO

Oil companies operating in the Seminole territory voted at a meeting held in Tulsa to continue the program of curtailed production for a period of 30 days from October 5, with certain modifications.

The state auditor at Springfield, Ill., estimates that the gasoline tax of 2 cents a gallon netted the state between $700,000 and $800,000 during August, first month of the tax.

DAVE BLAKER, of the production division of Phillips Petroleum Co., has been transferred from Webb City, Okla., to Mission, Kans.

EDMUND VAN ZANDT, JR., scout for the Gulf Oil Corp., Fort Worth, Tex., has left for the U. S. Marine Corps' officers' training school at Quantico, Va.

LEON E. SCHROEDER, division superintendent of motor transportation for Mid-Continent Petroleum Corp., Tulsa, has entered naval service as a reserve officer.

DON LEONARD and BERNARD M. JONES, of Rowmor-Leonard Drilling Co., have been appointed to the Isabella County, Michigan, rubber boot and shoe rationing board.

J. C. UMBARGER, of the production division of Cities Service Oil Co., Bartlesville, Okla., has left for training with the Seabees, construction battalion of the U. S. Navy.

HORACE H. WILKINS, Oil City, Pa., office manager for the Southern Group of Pipe Lines, has been retired after 49 years' continuous service with that organization. He has been in Oil City for 24 years.

M. L. HAYES, superintendent at Gladewater, Tex., for Selby Oil Co., is improving from injuries received when he was caught in a pump-house belt last week. Fellow workers found him unconscious on the floor.

LEE HAUGEN, refinery superintendent of the East Chicago refinery of Cities Service Oil Co., is being congratulated on his plant's record in establishing a total of 700,000 hours without a disabling injury. His 72 workers chalked up the longest number of accident-free hours in the history of the company's refining division.

W. L. MUNCY, of Standard Oil Co. of California, has been commissioned a lieutenant colonel of the U. S. Army and will be assigned as director, petroleum section, transportation service, Services of Supply.

REESE CLEVELAND, Midland, Tex., independent operator, has received notice of his appointment as a first lieutenant in the U. S. Army. He is to report to Fort Sam Houston, Texas.

WALKER S. CLUTE has been appointed secretary of the southern California section of the A.I.M.E. succeeding WALTER D. ABEL, resigned. Mr. Abel will remain as a member of the executive committee.

VIC CLINE, oil operator, a Midland, Tex., resident for several years, and more recently of Houston, has been commissioned a captain in the U. S. Marine Corps and has been sent to San Diego, Calif., for duty. He is a veteran of World War I.

B. C. LOW, general scout in the crude-oil department for the Humble Oil & Refining Co., Houston, Tex., has accepted a commission as first lieutenant in the Provost Marshals general department and will report for duty at Fort Oglethorpe, Georgia.

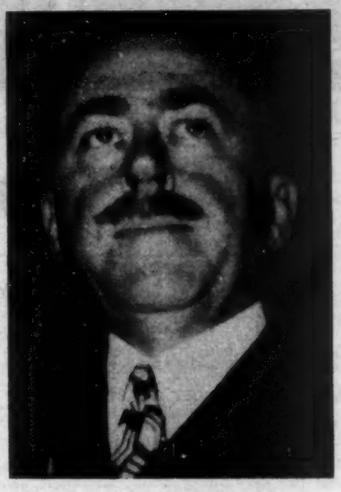
WILLIAM C. McDUFFIE, independent operator in California and former receiver for Richfield Oil Corp., has been commissioned a colonel in the Army Specialists Corps. He is scheduled to be assigned to the Ninth Service Command.

HENRY A. ROACH, geologist and independent operator, Fort Worth, Tex., has been inducted into the U. S. Army and is at the replacement center, Camp Wolters, Mineral Wells, Tex. Mrs. Roach will stay in Fort Worth as director of home nursing for the Red Cross.

T. A. GLOVER, crude-oil purchaser in Oklahoma for Magnolia Pipe Line Co., is being transferred to Dallas, Tex., headquarters as a promotion. On the occasion of his leaving fellow employes presented him with a platinum wrist watch. O. M. JOY is being transferred from the Wewoka district to Oklahoma City, Okla., to succeed Mr. Glover.

Experience Recruited

Thomas R. Armstrong, a veteran of 23 years' training and experience in the foreign producing division of Standard Oil Co. (New Jersey), last week became chief of the Foreign Requirements Liaison Branch of the War Production Board. The WPB branch which Mr. Armstrong now heads has just been created in the Foreign Coordination Division. The division was established earlier last week to recommend an integrated over-all national program to WPB's vice chairman on program determination.



THOMAS R. ARMSTRONG

Mr. Armstrong, who started his Washington war assignment immediately, will maintain liaison with the Board of Economic Warfare, Lend-Lease Administration, and all other agencies concerned with foreign purchases or requirements. In addition, he will review all other purchases by, or on behalf of, all foreign governments, following and expediting the preparation and presentation of their requirements estimates to meet the specifications and time schedule of the program coordination division.

Mr. Armstrong has been one of the key executives in most all foreign producing subsidiaries of Standard of New Jersey. He is a vice president and director of Creole Petroleum Corp., Lago Petroleum Corp., which operate in Venezuela; European Gas & Electric Co., which developed a substantial producing property in southwestern Hungary and of other subsidiaries previously operating in Mexico.

He was born 50 years ago in Corpus Christi, Tex., the son of a Texas Ranger captain and was reared on a cattle ranch in Southwest Texas. He was graduated from Princeton University in 1913 and 3 years later he took his law degree from Harvard law school. During World War 1, Mr. Armstrong served as a major of field artillery.

After being discharged from the Army in 1919, Mr. Armstrong joined Standard of New Jersey to take charge of an expedition to explore for oil in Colombia and Venezuela. Later, he established operating subsidiaries for Standard in Venezuela, Bolivia, and the Argentine.

A. E. McDANIEL, of Olson Drilling Co., has been transferred from Fort Smith, Ark., to Pauls Valley, Okla.

WATSON H. MONROE, geologist with the U. S. Geological Survey, addressed members of the Fort Worth, Tex., Geological Society Monday, on "Strategic Minerals."

GERALD WESTBY, Tulsa, president of Seismograph Service Corp., has returned from several months' patrol duty with the Civilian Air Patrol.

GEORGE L. THOMPSON, former operator at Ada and Shawnee, Okla., now is a first lieutenant in the Army, and is stationed at Camp Petree, near St. Joseph, Mo.

JAMES C. CORDELL, University of Kansas student, has been employed by Humble Oil & Refining Co., Baytown, Tex., as junior draftsman, inspection department.

JOE LILLY, formerly a scout for Stanolind Oil & Gas Co., at Amarillo, Tex., and currently in the Navy Aviation Corps at school in Norman, Okla., visited his home in Amarillo last week.

MURRAY MOFFATT is on leave from his duties as junior petroleum engineer for Sun Oil Co., to serve as mechanical engineer with the Navy Department. He is now with Ingalls Shipbuilding Corp., Pascagoula, Miss.

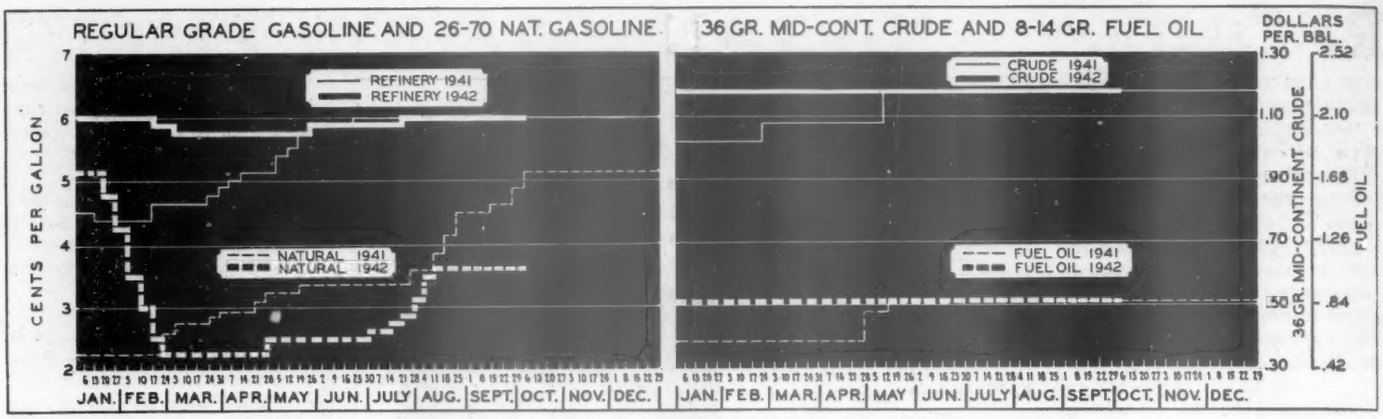
BYARD LOW, formerly head of Humble Pipe Line Co. in the Panhandle region of Texas, and later transferred to the Houston, Tex., office, is now a captain in the Army. He has had extensive military training and was also in the first World War.

RIP UNDERWOOD, president, Danube Oil Co., Amarillo, Tex., left last week for Miami Beach, Fla., where he is a lieutenant in the air force. Another Amarillo oil man to join the colors is JAMES E. SLEMP, president, Gibson Oil Corp., who has left for San Francisco, Calif., where he is a lieutenant junior grade in the Navy.

Shifts: R. A. HIBBERD, engineer, Standard Pacific Gas Line, Inc., Berkeley, Calif., to Menlo Park, Calif.; DICK SALE, superintendent, Harry Bass Drilling Co., Inc., Robstown to Odem, Tex.; RILEY S. SMITH, JR., geologist, the Texas Co., Harrisburg, Ill., to Mount Vernon, Ill.; G. L. KINCAID, superintendent, Swain-King Oil Co., Flora, Ill., to J. V. Dunbar Drilling Co., Farina, Ill.; H. GLENN COLE, engineer, Phillips Petroleum Co., Aetna, Kans., to Oklahoma City, Okla.; F. J. ANDERSON, president, Foley Brothers, Inc., St. Paul, Minn., to Colstrip, Mont. O. H. KRISTOFFERSON, geologist, Skelly Oil Co., Lansing, Mich., to Mount Pleasant, Mich.; J. P. WAGNON, superintendent, Parker Drilling Co., Shawnee, Okla., to Fletcher, Okla.; G. D. GIBSON, engineer, Petty Geophysical Engineering Co., Pauls Valley, Okla., to Sayre, Okla.; J. A. UPTON, superintendent, Magnolia Petroleum Co., St. Louis, Okla., to Drumright, Okla.; W. H. GEIS, superintendent, Union Oil Co. of California, Washington, D. C., to Los Angeles, Calif.; W. F. SHELTON, superintendent, Phillips Petroleum Co., Great Bend, Kans., to Golden, Colo.; C. E. McCLURE, engineer, Seismograph Service Co., Duncan, Okla., to Hobart, Okla.; D. P. DUGAN, engineer, Tuscarora Oil Co., Ltd., Lemoyne, Pa., to Camp Hill, Pa.; CLAY TYLER, superintendent, Phillips Petroleum Co., Canton, Miss., to Haynesville, La.; J. M. JUDSON, manager, Sinclair Refining Co., Chicago to Evanston, Ill.

E. J. READING, of Sun Oil Co., Evansville, Ind., was elected chairman of the Illinois basin chapter, A.P.I., Division of Production, at the chapter's quarterly meeting in Mount Vernon, Ill. Other officers elected were A. F. KEATING, Robey-Keating Drilling Co., Salem, Ill., first vice chairman, and I. G. BURRELL, Ohio Oil Co., Marshall, Ill., second vice chairman.

A. S. RITCHIE, president, McPherson Drilling Co., Wichita, Kans., was the principal speaker at the Engineers Club of Tulsa dinner meeting this week. He discussed the work of the District 2 production committee of the petroleum industry committee. C. V. MILLIKAN, executive vice president of the club, and chief engineer with Amerada Petroleum Corp., was in charge of the program.


REGULAR GRADE GASOLINE AND 26-70 NAT. GASOLINE
CENTS PER GALLON
REFINERY 1941
REFINERY 1942
NATURAL 1941
NATURAL 1942
JAN. FEB. MAR. APR. MAY JUN. JULY AUG. SEPT. OCT. NOV. DEC.
36 GR. MID-CONT. CRUDE AND 8-14 GR. FUEL OIL
DOLLARS PER BBL.
CRUDE 1941
CRUDE 1942
FUEL OIL 1941
FUEL OIL 1942
36 GR. MID-CONTINENT CRUDE
FUEL OIL
JAN. FEB. MAR. APR. MAY JUN. JULY AUG. SEPT. OCT. NOV. DEC.

MARKET DEVELOPMENTS . . .

Mid-Continent

NEW YORK.—Preparations for rationing fuel oil in almost two-thirds of the states moved ahead last week with the issuance of an order requiring all dealers to inform the OPA of the volume of stocks they had on hand September 30. The dealers were also instructed to cooperate with customers in determining the amount of fuel oil they consumed last year, one of the factors on which allotments for this winter will be based.

The prospect of nation-wide gasoline rationing is viewed with gloom by companies which have operating subsidiaries or affiliates in the Middle West. Nation-wide rationing will further reduce the proportion of gasoline required and will thereby decrease the refiner's net which already has been reduced by compliance with the OPC order for lower gasoline and higher fuel-oil yields. As a result of this and other factors the over-all value of refined products has declined abruptly this year in contrast to the steady gain for other commodities.

The move by East Coast oil companies to merge facilities will undoubtedly reduce costs, but is not expected, in itself, to even approximately approach the enthusiastic predictions that it would result in an increase of 100,000 bbl. per day in deliveries. A further substantial gain in shipments is expected before operating conditions slow down the movement, but this will result mainly from other causes. One effect of the pooling is expected to be the closing of additional East Coast refineries.

Another improvement in the prospects for coastwise-tanker movement was seen in the report that seven tankers were completed during September, the highest number in any single month for years. This raised the total for the year to more than 40, and while the 9-month total is 50 per cent above last year's total, it is still short of the 1942 goal.

East Coast

REFINERY product prices held firm this week despite the imminence of gasoline rationing and additional evidence that voluntary conservation of tires is making deep inroads into consumption. Contracts covering October business are virtually level with September, most refiners reported.

The demand for all grades of fuel oil, including kerosene, is in excess of current production by Mid-Continent refiners. Customers, including those on the East Coast normally not a factor in the interior market, are anxious to receive additional shipments. Refiners, generally speaking, are reluctant to increase shipments against contracts or to spot purchasers because of the possibility that the Office of Price Administration will authorize an upward adjustment of tank-car quotations. Another possibility still receiving active study, according to reports reaching refiners in the Mid-Continent, is that the Reconstruction Finance Corp., acting through one of its subsidiaries, may reimburse manufacturers for the higher costs involved in increasing fuel-oil output at the expense of the more-valuable gasoline.

Suppliers in the Middle West this week were asked to do another record-reporting task for OPA. They were enlisted by OPA in stipulating to fuel-oil customers the volume of fuel oil delivered during the winter of 1941-42 in order to give the consumer a tangible record upon which to base his application to rationing boards.

Shipments of all grades of fuel oil, but chiefly those in the distillate range for home heating, continued this week to move at record levels from interior plants.

Spot demand for motor fuel in the Chicago, St. Louis and Indianapolis markets was reported to have improved this week because of more favorable driving weather. There were no changes in tank-car quotations by a majority of the sellers.

SENTENCE SUMMARIES

MID-CONTINENT: Demand for products continued firm, particularly for kerosene and other fuel oils. Prices steady.

GULF COAST: Lend-lease shipments are holding at high levels, keeping stocks of most plant operators at satisfactory levels.

EAST COAST: Supplies tight. Pooling arrangements on terminals and other facilities may ease pressure. Prices unchanged.

PACIFIC COAST: Tone of gasoline market softens. All grades of fuel oil actively sought. Distillate grades particularly tight.

PENNSYLVANIA: Purchasers maintain pressure on most products. Neutral oils actively sought. Motor-fuel balance maintained.

A.P.I. REFINERY REPORT

Week Ended September 26, 1942

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Residual	Gas oil
Appalachian	180	2,850	517	699
Ind., Ill., Ky.	746	14,143	3,527	6,330
Okla., Kans., Mo.	352	6,558	1,334	1,961
Censored area*	1,689	38,807	18,537	23,336
Rockies	102	1,774	556	449
California	753	16,418	54,472	12,484
Total Sept. 26, 1942	3,802	80,550	78,943	45,259
Total Sept. 19, 1942	3,713	80,882	79,335	44,442
Total Sept. 27, 1941	4,031	80,005	94,197	51,629

Note: Refinery runs and stocks for week ended October 3, 1942, appear on Trends page.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and inland Texas at request of OPC.

CRUDE-OIL STOCKS

(Bureau of Mines estimate)

Week ended:	Bbl. of crude*
September 26, 1942	242,785,000
September 19, 1942	244,294,000
September 27, 1941	246,649,000

*Excludes heavy, unrefinable stocks in California.

Gulf Coast

HOUSTON, Tex.—There was little change in the Gulf Coast refinery market this week. Demand for all products exceeded that of last week, but sales were off due to lack of transportation facilities. Demand for all grades of fuel oil was especially acute but material was reported scarce.

While there was less demand for natural gasoline, prices were generally unchanged. The stock position in the Gulf Coast area is said to be in fair shape. This is owing to the increase in lend-lease business which is expected to be even higher in the near future as an all-out effort is under way to accelerate water movement.

Lubricants were being moved steadily with prices firm.

Pacific Coast

LOS ANGELES, Calif.—An increasing number of closed service stations has resulted in lower refinery operations, and declines in spot-market sales of gasoline. Small sales currently made are in lower brackets.

Fuel-oil demand continues and there is nothing to indicate any reduction in the near future. Fuel-oil consumption is the highest ever recorded and a further gain is generally anticipated.

All gas oil is being tightly held by marketers as blending material to raise fuel oil to Navy requirements or other high quality demands. Every barrel available is being snapped up and present stocks are closely held.

Usually at this time of year, marketers are accumulating natural gasoline for the winter season and would ordinarily start moving supplies into colder areas ahead of the demand but this is not possible on the conventional basis of operation. In August, natural-gasoline stocks were reduced and it is probable that stocks were also liquidated in September.

Early season demand for heating oils in the Pacific Coast territory will probably be lower than formerly because users in the Northwest filled tanks early in the summer.

REFINERY AND TANK-WAGON PRICES

(Prices as of October 6)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74-76	72-74	68-70	63-66	60 & lower
Mid-Continent*				5.875-6.000		5.500-5.625	5.125-5.250
Pennsylvania			6.750-7.000				
Gulf Coast‡	6.00-6.50			§5.750-6.250	§5.750-6.250	§5.250-5.750	§5.000-5.500
Northeast Coast	9.80			9.2	9.2		
Pacific Coast		6.500-7.000	6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250	4.750-5.000

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)†
Oklahoma (Group 3)	3.625	4.350	
North Texas	3.250	3.900	
North Louisiana	3.375	4.050	
California			4.875-5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*			4.500	4.375	
North Louisiana				4.500-4.750	
Pennsylvania	6.250-6.625	6.125-6.250			
California				4.500-5.500	4.250
Northeast Coast				6.80	
Gulf Coast				3.875	

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125				‡$1.35-1.45	$0.85-0.90
California		2.750-4.000				
Gulf Coast			4.000	4.125	1.45	0.85
Northeast Coast				6.800	2.780	1.65
North Louisiana						†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.85
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	†0.80-95	†0.80
Gulf Coast	3.875-4.0		1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300 §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00
Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.	

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

Neutral Oil

CALIFORNIA		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00
NEW YORK—		
Wax in bags fully refined:		
130-132 (A.m.p.) wax		5.850
133-135 (A.m.p.) wax		6.150
Crude scale:		
124-126 (A.m.p.) w.s.		4.250
124-126 (A.m.p.) y.s.		4.250

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.500	6.250-6.500	5.875	5.625
Pacific Coast		6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene	Diesel fuel				Bunker
	41-43	24 G.	48-52 D.I.	58 D.I.	Bunkers	C grade
Gulf Coast	4.000-4.250		4.125-4.375	4.375	$1.65-80*	$0.85-95
Pacific Coast	4.750-5.000	1.25-30			†1.35-45	*0.80-90

*Pacific Specification 400. †Pacific Specification 200

Lubricating Oils

	Neutral oils		Bright and cylinder stocks		
	200-3	150-3	200-3	150-3	600&630 S R
Mid-Continent	16.8		28.8	24.8	.....
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.45	5.50	10.20
Boston, Mass.	14.90	4.50	9.50
Burlington, Vt.	16.90	5.50	....
Buffalo, N. Y.	16.20	5.50	10.30
Dover, Del.	16.70	5.50	11.20
Hartford, Conn.	15.60	4.50	....
Manchester, N. H.	17.30	5.50	10.50
Newark, N. J.	14.70	4.50	9.40
New York, N. Y.	16.10	5.50	9.50
Philadelphia, Pa.	16.20	5.50	11.65
Pittsburgh, Pa.	16.70	5.50	12.00
Portland, Me.	16.30	5.50	9.60
Providence, R. I.	15.00	4.50	9.30
Washington, D. C.	14.70	3.50	10.70
Average 14 cities	15.91	5.07	10.32

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	21.40	7.50	11.40
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.45	7.50	....
Charleston, W. Va.	18.75	7.50	13.00
Charlotte, N. C.	19.60	7.50	11.00
Jacksonville, Fla.	21.40	8.50	10.40
Jackson, Miss.	17.50	7.50	8.50
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	18.60	8.50	10.50
New Orleans, La.	16.75	8.50	*10.00
Norfolk, Va.	16.95	6.50	13.50
Average 11 cities	18.58	7.59	10.58

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.57	5.96	10.76
Average last week	16.57	5.96	10.76

Canadian Fields

(Continued from Page 80)

ft. In southwestern Saskatchewan, about 6 miles east of the Alberta boundary, Twin Provinces 1, LSD 6, 21-11-29w3, has resumed from 2,700 ft. to test the limestone expected around 3,400 ft. Some oil and gas shows encountered in the original drilling will be tested when the hole is completed.

Ontario Shallow Crude

In the abandoned Dutton shallow field, in Elgin County, Ontario, National Oil Well Contractors are continuing reconditioning operations for Empire Oil Royalties of Toronto. Some four out of 59 shallow wells have been reconditioned. After acidizing failed to give definite results, shots of 500 sticks of dynamite weighted with 60 ft. of sand were tried on Nos. 55 and 57, resulting in a fair pumping production with considerable gas. Operations are continuing.

Muddy Lake Test

In the Vera-Unity area of western Saskatchewan, Unity 1, LSD 8, 14-23-39w3, has spudded and is drilling ahead. The test is sponsored by Arthur Kendall and associates of Regina. A gas and water flow is expected around 40 ft., which it is planned to utilize in drilling. The lime contact is expected around 2,133 ft. Location followed a geophysical survey by Dr. F. F. Hintze, consulting geologist, of Salt Lake City.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast, Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

Information supplied by "Oil and Gas Journal"

Despite their bulk, swivels on rotary drilling rigs are precision machines and should be treated as such. These precautions will lengthen their life:

1. Reducing speed reduces wear. A swivel operated at 100 r.p.m. will last four times as long as one run at 200 r.p.m.
2. Avoid "swivel boiling". It causes premature failure of packing and bearings.
3. Keep all glands properly packed, greased and tightened. Replacing the wash pipe packing when necessary avoids scoring of the pipes.
4. Keep good, clean oil of proper weight in the swivel at all times.
5. At first sign of swivel trouble, remove from service, dismantle and inspect.
6. Don't permit elevators to bump against the swivel. If no bumping device is provided, fasten one on the derrick floor.
7. When drilling has reached the point where swivel is just above the rotary table, feel the bowl for heat and feel the swivel before each joint is added. Bearing failures are preceded by excessive heat.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED · FERROMOLYBDENUM · "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Ave. New York City

MOLY

EQUIPMENT PROGRESS...

Alston Ratchet Pipe Cutter

J. I. Hill Co., exclusive sales representative, has just announced a new ratchet-type pipe cutter being manufactured by the Alston Machine Shop, Livingston, Tex. This new-type cutter, which has been thoroughly tested in the field for more than 3 years, is being offered in straight sizes for specific size of pipe from 6 to 26 in. and in combinations to handle two sizes of pipe from 6 to 4 in. and 26 to 24 in. The manufacturer states that this pipe cutter has patented roller guide

members which hug the pipe and prevent any of the three cutters from executing more than the predetermined cut. This feature also forces the cutters to penetrate thick places in the pipe. These rollers, equally spaced around the circumference of the pipe, hold the pipe taut after being cut and eliminate the hazard of broken cutters or dangerous sparks. A square cut is assured, the manufacturer states, by attaching bands to either side of the cutter. The bevel tool, which can be set by an individual adjustment screw to any required depth, follows in the path of the cutter, removes burrs from edge of pipe and automatically conditions it for welding, threading or sleeving. This bevel tool may be used singularly for cutting cast-iron pipe. Simply raise the three cutters with the set screws provided and allow the bevel tool (same type as on lathe) to contact the pipe.

Finally, the ratchet principle enables operators to work in close quarters and eliminates the need to dig bell holes to cut buried pipe.

J. I. Hill Co., 1011 Shell Building, Houston, Tex., will furnish additional information and complete prices on this new ratchet-type pipe cutter.

Large Number of Foreign Guests At Los Angeles Nomads Meeting

Over 200 Nomads, guests and wives of Nomads and guests attended the annual barbecue of the Los Angeles chapter of Nomads held at the Hollywood Trout Lakes Saturday, September 26.

The attendance exceeded expectations and from reports received the party was most successful from every standpoint. The Lakes were opened for the exclusive use of the Nomads at 3 p.m. and dinner was served at 5:30. In addition to trout fishing there was dancing and other entertainment.

Among the guests were John H. Baird and I. Frank Brown, of the New York chapter of Nomads. The foreign guests included Mr. and Mrs. H. C. Creath, formerly of Colombian Petroleum Co., who have just returned from Pearl Harbor; Mr. and Mrs. H. J. Buddenhagen, formerly of the Caribbean Petroleum Co.; Mr. and Mrs. P. M. Bowen, D. & E. Co. of Brazil; Mr. and Mrs. B. R. Cunningham, Caribbean Petroleum Co.; Mr. and Mrs. John Domercq, California Arabian Standard Oil Co.; Mr. and Mrs. L. E. Grainger, formerly of Caribbean Petroleum Co.; Mr. and Mrs. A. N. Lucie-Smith, Caribbean Petroleum Co.; Mr. and Mrs. Meade McCamey, N.K.P.M.; Mr. and Mrs. C. H. Vincent, Assam Oil Co., Ltd.; Mr. and Mrs. Jess Rector, Lethbridge, Alberta; Mrs. Walter L. Little, International Petroleum Co., Ecuador; Mrs. Ernest H. Smith, California Arabian Standard Oil Co.; G. G. Goodwin, Tropical Oil Co.; Karl Jauman, formerly of Antilles Petroleum Co.; Clarence Ochs, Ecuadorian Oilfields, Ltd.; C. A. Petrie, Assam Oil Co., Ltd.; and R. N. Scott, Burmah Oil Co., Ltd.

Axelson Manufacturing Co. Awarded Army-Navy "E"

On September 3, Axelson Manufacturing Co. climaxed half a century of progress by receiving the Army-Navy "E"—dramatic testimony to the production efforts of 1,200 workmen, and fitting tribute to a lifetime of endeavor by a hard-working, keen visioned management.

G. A. Axelson, chairman of the board of Axelson Manufacturing Co., accepted the award for the company at the ceremony attended by high-ranking Army and Navy officers, civic and industrial leaders, employes and friends of the firm. Sheriff Eugene W. Biscailuz of Los Angeles County acted as program chairman.

Hedlund Elected President Of Elastic Stop Nut Corp.

William T. Hedlund, Summit, N. J., formerly vice president of Electrolux Corp. in charge of engineering, has been elected president of Elastic Stop Nut Corp., Union, N. J., of which company he has been a director. Mr. Hedlund is widely known both in legal and industrial circles as a patent authority.

Power Transmission Expert Joins Staff of Foote Bros.

Foote Bros. Gear & Machine Corp., Cleveland, Ohio, announces the recent addition to its contact engineering staff of Irwin A. Marshall, who will represent the company in the Cleveland and Northern Ohio territory.

Widely known in this area as an expert in the power-transmission field, Mr. Marshall has been serving industry for the past 12 years in Ohio and the central states as a sales engineer and specialist on speed reducers, couplings, and gears. He has been a resident of Cleveland for 30 years, and is a graduate of Cleveland College.

TRADE LITERATURE

B. F. GOODRICH CO., Akron, Ohio.—A 30-page Rubber Guide Book for American War Industries, listing the application and properties of many types of products for industrial and aeronautical purposes using natural, synthetic, or reclaimed rubber. It was designed to present maximum information in easily accessible, indexed, condensed form. Well illustrated throughout, the booklet is divided into 11 indexed sections, under the following headings: Properties of Ameripol (synthetic rubber compounds developed by B. F. Goodrich) hydraulic equipment parts, sponge products, industrial rubber gloves, extruded rubber goods, Anode process of rubber coverings, industrial and aeronautical molded goods, hard-rubber parts, rubber cements, lathe-cut rubber goods, and properties of reclaimed rubber.

Fluor Establishes Schools for Training Piping Draftsmen

One of the principal bottlenecks which occurred during the aircraft industry's vast expansion program was caused by the scarcity of trained aeronautical draftsmen. To relieve that situation, the aviation industry, with government cooperation, initiated a novel plan whereby vocational schools were established at the various airplane plants for the conversion of engineers from other fields into aeronautical draftsmen. So successful was this plan in the results obtained and in operation that it has been adopted by the petroleum industry in the field of refinery and natural-gasoline-plant engineering and design as a means of bringing quick relief to a serious bottleneck which threatens to develop through the scarcity of piping draftsmen, retarding petroleum-plant construction.

The first of these schools was recently established by the Flour Corp., Ltd., where the drafting department has undergone a growth from 60 draftsmen, before the war, to a point where the company now employs 225 and has provided facilities for a total of 300 draftsmen. Students from the classes will supplement that number upon completion of the course.

Instructor of the class is Walter Lipman, formerly employed as a piping draftsman by Union Oil Co. of California and General Petroleum Corp. and currently employed as a vocational teacher with the Los Angeles County Board of Education in the Montebello, Calif., school district. Mr. Lipman is paid by the Montebello school district which is reimbursed for his salary by the federal Government as part of its defense educational system. Fluor in turn employs and pays each student a wage during his period of instruction.

To accommodate the students and to provide the necessary facilities, Fluor built a special classroom building. Classes are limited to a total of 24 students so that thorough personal instruction and supervision of each student is possible, but no definite time is set for the progression of the student from classroom work to Fluor's drafting department.

One of the features of the plan is the inclusion of women in the classes. They are required to meet the same qualifications as men as to education and previous experience.

View of Fluor piping drafting room

CLASSIFIED ADVERTISING

THE MARKET PLACE OF THE OIL INDUSTRY . . .

Patent Attorneys

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Form "Evidence of Conception" with instructions for use and "Schedule of Government and Attorney's Fees—FREE.

LANCASTER, ALLWINE & ROMMEL
Patent Law Offices
418 Bowen Bldg., Washington, D. C.

Leases and Drilling Blocks

LEASES—East Texas, La., South Ark. 20 acres up, dollar acre up.—Owners—Address Attorney, Box 1122, Little Rock, Ark.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
20 Years' Experience
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton St. Louis, Mo.

FOR SALE: Oil and Gas leases on proven structures. drilling propositions. small production and fluorspar deposits. Reports furnished. W. P. Harley. Bowling Green, Ky.

FLORIDA Oil Leases for sale—Jackson, Holmes, Washington counties. Spreads of 1000 acres; 25 cents per acre; 10-year leases; 10-cent rental. Paid up to 1943. Why wouldn't the Gulf Coast oil trends extend across Florida? Write for further information, 609 Gulf States Bldg., Dallas, Texas.

FEW small tract considered on structure near 9,000 ft. East Texas Wildcat starting. Closing out 25 for one bets short time. E. Croft, Proctor, Texas.

WANTED TO BUY: Crude oil producing properties. Give number of wells, location, field, daily production, acreage, and price in first letter. Box B-290, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Oil and gas leases North and South Dakota, reasonably priced. Owner, P. O. Box 1163, Tulsa, Oklahoma.

BARTLESVILLE Sand lease, 280 acres, 20 to 50' pay. Excellent water drive proposition, 3 successful ones vicinity; 4 wells on lease. Cash, over-ride, or working interest considered. Box B-281, The Oil and Gas Journal, Tulsa, Okla.

TO LEASE: The best Petroleum lands of CUBA according to Government Geologists. 1000 acres. Come and see them. Gustavo Roig, Capdevila 57, Habana, Cuba.

Legal Blanks

THE BURKHART LINE of Legal Blanks Since 1908. Oil-Gas and Business Forms for Mid-Cont. and Illinois Basin. Leases Rev. with Gov's Regulations. Catalog and Samples. Burkhart Ptg. & Sta. Co., 115 So. Cincinnati, Tulsa, Okla.

Financing

CAPITAL SEEKERS — Interested in raising $25,000 or more for a legitimate project should communicate with AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

CORPORATION FINANCING, mining or oil. Services and facilities offered to assist undertaking merit. Box B-300, The Oil and Gas Journal, Tulsa, Okla.

Incorporation

DELAWARE CHARTERS: Complete service $36. Submitted forms. Chas. G Guyer, Inc., Wilmington, Delaware.

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

OIL PRODUCERS urgently need these 2-U.S. and 1 Canad. Patents for the Extraction of Oil from exhausted formation of Petroleum and Oil bearing sands, for sale or in royalty by Leo Strandell, Lometa, Calif.

FOR SALE: Landowner's Royalty under 120 acres leased to Humble Oil & Ref. Co. in Lea Co., N. M. North of the Big Hobbs Pool. 27 pools in County, HARRY S. WRIGHT, FARMINGTON, N. M.

Ranches and Farm Lands

FOR SALE BY OWNER
8-section grass pasture and 280 acres of irrigated farm land 10 miles south of Roswell and ¼ mi. of main highway. W. H. Woodman, 806 N. Penn, Roswell, N. M.

50,000 ACRES AT $5.50. Well improved cow ranch. Worlds of gramma grass, also brushes, lots of water, good fences (five wires), six pastures, on railroad and highway, near good towns, immediate possession. Low taxes. W. H. Wilson, Carrizo Springs, Texas.

Situations Wanted

EXECUTIVE with thirty years experience in the oil business part of this time with major company and as vice-president of major independent company also as independent oil producer desires connection with independent company or with parties with money to invest in the oil business as there are many opportunities in the southwest to make money. Box B-262, The Oil and Gas Journal, Tulsa, Okla.

PATENT ATTORNEY widely experienced in patent matters pertaining to the oil industry, including patent prosecution, infringement and validity investigations, preparation of opinions, contracts and license agreements relating to patents, and litigation. Also experienced in trade mark and copyright matters. Graduate of first class engineering and law schools. Desires to make new mutually beneficial connection, preferably with a corporation. Draft deferred. Box B-301, The Oil and Gas Journal, Tulsa, Okla.

Business Opportunities

REFINERY FOR SALE. For particulars write to Albany Oil and Refining Company, Box 433, Laramie, Wyoming.

Help Wanted

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

ENGINEERS WANTED
Chemical or Mechanical with minimum one year oil refinery plant operation or maintenance experience. Require University Engineering School graduate with basic knowledge principles fluid flow. To work on process flow sheets, equipment selection and general handling oil refinery. Defense Contracts as assistant to senior engineers. No aliens or men engaged Defense work considered. Opportunity up to individual. In reply state experience, education, draft status, salary expected. Foster Wheeler Corporation, Room 2402, 165 Broadway, New York.

WANTED
REFINERY DESIGN ENGINEER
Permanent position for man with thorough knowledge of pressure vessel and piping design. Experience as chief draftsman and construction engineer is desirable. Location middle west. Medium size independent company. In reply please specify personal data, experience, draft status, and salary required. Reply Box B-292, The Oil and Gas Journal, Tulsa, Okla.

OIL RATIONING
WHY WORRY?
Users of AMPION Boiler room chemicals save on fuel in 3 ways. (1) Eliminate sludge (2) Destroy soot and carbon (3) Purify boiler feed water. There is unprecedented demand for these products. In bulk to industrial plants, etc. Also a jobbing arrangement. Inquire if your territory is open. Only salesmen in the heating field with outstanding sales records will be considered. Box B-303, The Oil and Gas Journal, Tulsa, Okla.

Oil Industry Printing

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Old-Press. 215 East Third St., Tulsa, Okla.

Equipment Wanted

ATTENTION INVENTORS
Old established Pacific Coast Manufacturing Company is interested in acquiring patented or patentable items for manufacture on either outright purchase or royalty basis. Box B-251, The Oil and Gas Journal, Tulsa, Okla.

Equipment Wanted

WANTED—Steel tanks total 120,000 gallon capacity. Will take 5000 gallon or larger. Tidewater Equipment & Machinery Corp., 305 Madison Ave., New York N. Y.

WANTED TO BUY

Pipe of all sizes, 2" to 16", inclusive, also refineries, pipe lines and abandoned wells. Wire. write or phone

Louisiana Iron & Supply Co.
Shreveport, La.

FIFTY 5" OD x 25' long Hot Drawn Seamless Tubing with an average wall thickness of either ¼", ⅜" or ½". Pan American Petroleum Corp., Destrehan, La.

WANTED: 64,000 ft. of 6 inch seamless high pressure line pipe or can use drill pipe. State location and price. Will buy in small lots. Melton Machinery & Supply Co., Seminole, Okla.

WANTED: Used wax molding press. Please state condition, location, and price. Box B-293, The Oil and Gas Journal. Tulsa, Okla.

USED, good condition, 16 inch by 12 foot bed lathe with taper attachment and steady rest, equipped with motor drive. Also grinder attachment for above lathe for grinding pistons, etc. Box 1011, Mt. Pleasant, Texas.

WANTED

Abandoned *Pipe Lines*, in or out of the ground, *Oil Wells*, *Steel Buildings* and Steel Storage *Tanks* of all sizes.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, St. Clair Co., Illinois.

WANTED: Inside Micrometers, range 2 in. to 14 in.; also outside micrometers, same range. Would consider instruments covering part of these ranges. In reply give make, style, graduations, and price. TALCO ASPHALT & REFINING DIVISION OF SOUTHPORT
P. O. Box 1011, Mt. Pleasant, Texas

For Rent—Equipment

TO LET—Complete Fort Worth Super-J Spudder 5000 feet casing, 160 acre lease proven Kansas City lime production near pipe line. Butler County, Kansas. Box B-302, The Oil and Gas Journal, Tulsa, Okla.

For Sale—Equipment

FOR SALE: Complete Wilson Portable Rotary Rig with telescoping mast, suitable for 2,000 ft. drilling. Melton Machinery & Supply Co., Seminole, Okla.

TWO vertical type Askania Magnetometers. Also one complete Helland resistivity outfit. Write Box B-285, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Complete Power Rig with three caterpillar Diesel motors, 425 H.P. suitable for 7000 foot drilling. Write Box 711 Longview, Texas.

FOR SALE: Line pipe racked near Toronto, Kansas. 10 miles 2" screw, 3 miles 4" P.E., 2500' 5" P.E., 1500' 6" P.E. Phone Earl Orr, Toronto, Kansas.

FOR SALE: Special 4" pipe line equipment, new or nearly new. Pipe cutting, beveling machine, Holiday detector, tar kettles, Model F cleaning and priming machine, Rola Grip couplings. Tipton line up clamps, Petol tongs and others. No priority required. RAY R. LITTRELL, CONTRACTOR, Box 13, LaGrange, Ga.

CLASSIFIED ADVERTISING RATES

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	$1.05	$1.80	$2.55	$3.30	7 Lines	$2.45	$4.20	$5.95	$7.70
4 Lines	1.40	2.40	3.40	4.40	8 Lines	2.80	4.80	6.80	8.80
5 Lines	1.75	3.00	4.25	5.50	9 Lines	3.15	5.40	7.65	9.90
6 Lines	2.10	3.60	5.10	6.60	10 Lines	3.50	6.00	8.50	11.00

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1 Inch	13 times	4.50 per inch
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1 Inch	52 times	3.50 per inch

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

NEW COMPLETE INVENTORY

- Towers
- Vessels
- Storage Tanks
- Pumps
- Compressors
- Instruments & Meters
- Condensers & Exchangers
- Pipe
- Tubes & Headers
- Valves & Fittings

• Listings of Plains Oil & Refining Corp. included

Wire—Phone—Write for your copy

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry or H. J. Galamba
Riverside at Second, Kansas City, Kansas

Robert W. Duden
Twenty-First at Union, Tulsa, Oklahoma

STORAGE TANKS

1—55,000 bbl. All Steel Riveted—6 Ring

1—55,000 bbl. All Steel Riveted—5 Ring

OFFERED FOR IMMEDIATE SALE, LOCATED EAST TEXAS. WIRE—PHONE—WRITE

SONKEN-GALAMBA SUPPLY CO.
Union Ave. at 21st St., Tulsa, Okla.
L.D. 410

FOR SALE
COMPRESSORS

Complete Repressuring or Air Lift Plant for Immediate Delivery.

2—13 & 5½ x 12 Ingersoll-Rand XOB compressors 400# pressure V-belt driven by 120 H.P. Chicago Pneumatic 3-cylinder vertical gas engines.

2—12 & 7 x 10 Chicago Pneumatic 400# pressure vertical compressors direct connected to 120 H.P. 3-cylinder Chicago Pneumatic vertical gas engines complete.

Used very little — excellent condition. Located on original foundation in Louisiana.

EARL E. KNOX COMPANY
Erie, Penna.

FOR SALE: Approximately 250—2", 3", 4" and 6" LH EH SL UP Klein Pipe Tongs, used. $1.00 per inch per tong. Patridge, Cities Service Oil, Bartlesville

STORAGE TANKS, Vessels, Towers, Pumps, Engines and other gasoline plant equipment. GILBERT PIPE & SUPPLY Electra, Tex.

FOR SALE: 50—5½" OD Standard IBBM NRS SE CI Gate Valves, unrepaired. $10.00 each. Patridge, Cities Service Oil, Bartlesville, Okla.

FOR SALE: 7¼ x 14 Oil Well Powe Slush Pump. Melton Machinery & Suppl Co., Seminole, Okla.

FOR SALE: 3—16" Baash-Ross Blow-out Preventers. Patridge, Cities Service Oil, Bartlesville.

BARGAIN—12 KW 125-Volt G. E. Generator complete with switch board. GILBERT PIPE & SUPPLY, Electra, Tex.

25 K.W. and 40 K.W. Gas Engines, 22 volts, D.C. Two 100 K.W. Gas Engine Generator Sets, 220 volts, D.C. 7x6 Inger soll-Rand ER-1 Air Compressor. Six-inc Oster Pipe Threading Machine. Also larg stock of lathes, pipe machines, millin machines, etc. Send for our list.

Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO
26 West 2nd St., Cincinnati, Ohio

FOR SALE: 60—4" 8V Thd. Fairbanks Sphero SE Valves, unrepaired. $10.00 each. Patridge, Cities Service Oil, Bartlesville.

FOR SALE: Star Mfg. Company, port able cooling tower, telescoping type, 7 wide, 13' long, 8' high. All steel. Melto Machinery & Supply Co., Seminole, Okla

FOR SALE: 30—1½ KW Steam Turbine Generators. $25.00 each. Patridge, Cities Service Oil, Bartlesville, Okla.

FOR SALE: At Oklahoma City, one Sectional Steel sand or rock storage bin with two dump valves, $350.00. Patridge, Cities Service Oil, Bartlesville, Okla.

FOR SALE: 27½" Ideal Rotary Table, 5 sheave 200 ton Crown Block, 4 sheave 72" traveling block, 8" Ideal enclosed rotary hook. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: 50—5½" OD 11½V Thd, 200—7" OD 10V Thd and 25—10" 8V Thd., used CI Flat Plugs, cheap. Patridge, Cities Service Oil, Bartlesville, Okla.

DIESEL—GAS—ENGINES

Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.

Complete information on request.

A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE: At Oklahoma City, 50 Solid and Split Casing Spiders with Slips for 9" and 9⅝" OD Casing. Complete, $50.00 each. Patridge, Cities Service Oil Co., Bartlesville, Okla.

40,000 Ft. 2" Line Pipe, Screw & P.E. Also 3", 4", 5½" 7", etc. Large stock of fittings, valves & other used material. GILBERT PIPE & SUPPLY, Electra, Tex.

FOR SALE: 85—7" OD 10V Thd. SE 1500-lb. WP CS Hughes Drilling Through Control Gates, unrepaired. $100.00 each. Patridge. Cities Service Oil. Bartlesville.

FOR SALE: 6 x 16 Wilson-Snyder Power Slush Pump. Melton Supply Co., Seminole, Okla.

1 COOPER-Bessemer 3 cylinder engine. Type G M R size 12" x 14", 225 HP direct connected to Cooper-Bessemer Compressor, high side 12" x 14", low side 6½" x 14". Excellent condition. Box B-291, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE—23,000' of ⅝" and 3,000' of ¾" Pump Rods. Four 87' MIW 157,000 Lb. Derricks. One TC20B Oil Well Pump Unit. All in first class condition. Dirks Brothers, Tuleta, Bee County, Texas.

NEW OIL WELL DRILLING EQUIPMENT FOR SALE

Equipment purchased for shipment abroad sometime ago, now being offered either in part or in its entirety. Consists of large number Hughes Simplex Rock Bits, Reamers, Fish Tail Bits, Drilling Jars, Worthington Pumping Sets, Boring tubes, Drill Pipe Collars and miscellaneous replacement parts. Material located in New Jersey. Itemized lists furnished on request. Attractive prices.

MARINE METAL & SUPPLY CO.
167 South Street New York City

FOR SALE

We offer 523, 55-ton all-steel, self-clearing DOUBLE HOPPER CARS, consisting of:

160 USRA construction; built 1921-1922; with A-B brakes 1880 cubical feet capacity.

363 built 1910-1915; with KD-1012 brakes, 1683 feet capacity

ALL HAVE FULL "U" CAST STEEL TRUCK FRAMES

Purchaser must buy all.

PRICE: $1700.00 each f.o.t. Pennsylvania

TERMS: Cash with purchase.

DELIVERY CAN COMMENCE IMMEDIATELY AND BE COMPLETED IN ABOUT 60 DAYS—AND VERY POSSIBLY SOONER.

Some $30,000 to $40,000 NEW REPAIR MATERIALS also available which you may wish to have inspected at the same time.

TIME and EXPEDITION ESSENTIAL and DESIRABLE

Yours for Victory,

IRON & STEEL PRODUCTS, Inc.

37 years' experience

13412 S. Brainard Ave., Chicago, Illinois

"ANYTHING containing IRON or STEEL"

For Sale—Instruments

FOR SALE: Star machine with tools, 5" to 10" complete. Would consider working on same, or anything pertaining to the oil field. Have had years of experience handling production. D. G. Minesinger, 308 North Street, Iola, Kansas.

FOR SALE—A large stock of reconditioned valves and fittings suitable for refinery and pipe line service. Inquire Eason Oil Company, Enid, Okla.

FOR SALE—At bargain prices, a large quantity of magnesium rock wool and pipe insulation. Inquire Eason Oil Company, Enid, Okla.

FOR SALE—Three 15 x 10 and one 12 x 10 Pneumatic Compressors less motors or power units. In excellent condition, suitable for low pressure service. Inquire Eason Oil Company, Enid, Oklahoma.

FOR SALE AT BARGAIN—2 complete drilling rigs, 1 Unit Rig Company U-10 with 13,000 Diesel caterpillar with 7½ x 12 G. D. pump; also 1 type R. Cardwell double drum draw works, 160 HP engines ready to move on job. Box 1439, Tulsa, Okla.

FOR SALE: 1-5½ Keystone Spudder with International motor, portable tool house, fifteen hundred foot ⅝" wire line and complete set drilling tools.

1-practically new 45 Star Spudder (extra good).

1-110 H.P. Twin 2 stage direct driven Miller compressor.

VEEDER SUPPLY & DEVELOPMENT CO.
Cherryvale, Kansas

⅞" Oklahoma City used sucker rods, 50,000 feet, good condition. 50—10 and 12" x 23' Channels. 3—24" x 20' Beams and some short pieces, smaller sizes. Some reinforcing sucker rods, all at Oklahoma City. M. R. Travis, 1702 S. Boulder, Tulsa, Okla.

Steel VALVES!

Cast and Forged
Also
Cast Iron Valves
Standard and High Pressure

Every Type Used in an Oil Refinery

All Expertly Reconditioned and GUARANTEED to Perform Like New.

No Delays
Immediate Delivery
YOU SAVE 25%
Over Cost of New Valves

Brown-Strauss Corporation
1446 Guinotte . . . Kansas City, Mo.

FOR SALE: 12 K.W. Portable Light Plant Powered by 35 H.P. International Engine. Melton Supply Co., Seminole, Okla.

If we do not maintain a classification exactly suited to the type of advertisement you wish to run we shall be glad to create a fitting one.

Classified Department

Texas Oil Men Urged to Save Rubber by Lease-Quota Plan

HOUSTON, Tex.—Mark McGee, Texas tire-ration chief of the Office of Price Administration with headquarters at Dallas, Tex., last week advised transportation representatives of the oil industry in South Texas that unless they pooled their trucking facilities and eliminated duplicate routes they would not get recaps and retreads for their automobiles and trucks.

The administrator discussed rubber-rationing problems with a group of oil men and representatives of other industries at a meeting in Houston, October 2.

Mr. McGee stated that the OPA has under consideration the question of calling company representatives to a meeting to discuss the question of reducing the use of rubber and other vital materials in the operation of oil leases. He said that this had been considered even before the question was brought up for discussion at a recent state-wide oil and gas hearing before the Texas Railroad Commission.

The plan under consideration by the commission is an amendment to its existing rules, authorizing a lease quota of production in lieu of the per-well allowable now in effect. The administrator stated that the rationing office was seriously considering refusing tires to oil companies unless a lease allowable plan was worked out. Such a plan, Mr. McGee said, would force oil companies to press the Texas Railroad Commission to change proration policies. The theory behind the new allowable plan is that it would require fewer men and less equipment to operate on a lease basis. Oil men considered that such a plan would reduce the number of cars and the rubber requirements by several per cent.

Journalisms;

THE value of the Journal's pipeline maps to the oil industry is an old story, but we are continually being reminded of their importance to the war effort. Requests come in for additional copies in small and large batches from civil, military and naval organizations interested in transportation and procurement of supplies. Among the calls last week was one from an officer responsible for the prevention of sabotage of buildings and equipment in one of our most important corps areas. He said that there was no other source for the information provided by the maps and he was most complimentary regarding their completeness. It is not easy to publish these maps in times like these, but recognition of this sort is a most satisfying reward for our efforts.

•

A READER suggests that those who wonder why we are talking about a shortage of oil when our reserves remain at a high level take a glance at the situation of the Japanese. Proven reserves in their possession are also at an all-time peak but they are hampered in making use of them by a shortage of steel and labor. Of course our wells are not in the same condition as theirs but the Japanese oil industry does not have to consider economics.

•

SPEAKING of economics, it is refreshing to note that the petroleum coordinator is fully aware of the difficulties faced by the oil industry in supplying petroleum and its products under a price ceiling with all costs increasing and a compulsory switch from more to less profitable lines. His talk before the Interstate Compact Commission showed that he was not confusing the needs of the suppliers of an indispensable war material with "business as usual."

•

A RESIDENT of the Back Bay section of Boston seeks support in discussions with friends in which she is asserting that this country has been employing pipe lines for petroleum and natural gas to a considerable extent for a long time.

"The people here in the East think pipe lines are something new," she writes. "I remember visiting a building out of Elwood, Ind., in 1919 which was quite similar to a telegraph office—only instead of wires there were pipes. . . . Then in 1930 while spending a winter in San Antonio, a pipe line was being constructed down Brownsville way. . . . I have tried to tell friends of this but they seem to need a more authentic source in order to believe that pipe lines have been widely used."

Possibly Irene Dunne could give a New England broadcast on her motion picture dealing with this subject.

•

COOPERATION between government and industry is often envisioned by the oil man as analogous to cooperation between a hungry man and a steak. Arkansas Oil and Gas Commission engineers have prepared an article for the Journal which will be published in next week's issue and which proves that this point of view may be mistaken. Corrosion of casing is a problem of the first magnitude in the sour gas fields of that state. Following a study conducted by the commission recommendations were issued and operators are proceeding with remedial work without needing a formal order from the commission. The fact that the proposals were effective and practicable probably helped.

CALENDAR

October

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, twenty-third annual meeting, Dallas, Tex., October 8-10.

WESTERN PETROLEUM REFINERS ASSOCIATION, technical meeting, Wichita, Kans., October 9.

AMERICAN WELDING SOCIETY, annual meeting, Cleveland, Ohio, October 12-15.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, fall meeting, Rochester, N. Y., October 12-14.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Hotel Ambassador, Los Angeles, Calif., October 15-16.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, thirteenth annual convention, Wichita, Kans., October 19-21.

NATIONAL STRIPPER WELL ASSOCIATION, annual meeting, Wichita, Kans., October 19.

SOCIETY OF AUTOMOTIVE ENGINEERS, Midwest Fuels and Lubricants regional meeting, Tulsa, October 22-23.

NATIONAL LUBRICATING GREASE INSTITUTE, tenth annual meeting, New Orleans, La., October 25-29.

NATIONAL ASSOCIATION OF CREDIT MEN, Petroleum Division, St. Louis, Mo., October 26-28.

NATIONAL SAFETY CONGRESS AND EXPOSITION, thirty-first annual meeting, Sherman Hotel-Palmer House, Chicago, Ill., October 27-29.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Austin, Tex., October 29-31.

WESTERN PETROLEUM REFINERS ASSOCIATION, technical meeting, Shreveport, La., October 30.

November

CALIFORNIA NATURAL GASOLINE ASSOCIATION, Los Angeles, Calif., November 6.

PETROLEUM ELECTRIC POWER ASSOCIATION, business session of member-company executives and election of officers, Baker Hotel, Dallas, Tex., November 12.

AMERICAN PETROLEUM INSTITUTE, twenty-third annual meeting, Palmer House, Chicago, Ill., November 9-13.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, thirty-fifth annual meeting, Netherlands Plaza Hotel, Cincinnati, Ohio, November 16-18.

AMERICAN ASSOCIATION OF OILFIELD DRILLING CONTRACTORS, second annual meeting, Mayo Hotel, Tulsa, November 19-20.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, annual meeting, New York, November 30-December 4.

AMERICAN CHEMICAL SOCIETY, national chemical exposition and national industrial chemical conference, Sherman Hotel, Chicago, Ill., November 24-29.

December

NEW MEXICO OIL AND GAS ASSOCIATION, annual meeting, Artesia Hotel, Artesia, N. M., December 2.

PETROLEUM ACCOUNTANTS SOCIETY OF OKLAHOMA, Hotel Mayo, Tulsa, December 17.

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